

THE ROLE OF THE ATTACK HELICOPTER  
IN OPERATIONS OTHER THAN WAR

A thesis presented to the Faculty of the U.S. Army Command and General  
Staff College in partial fulfillment of the requirements for the degree

MASTER OF MILITARY ART AND SCIENCE

by

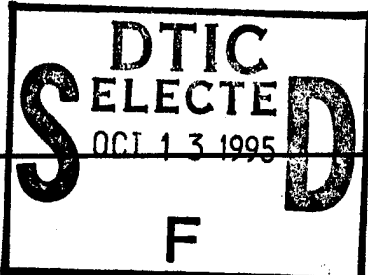
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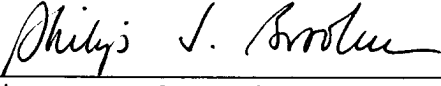
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## ABSTRACT

### THE ROLE OF THE ATTACK HELICOPTER IN OPERATIONS OTHER THAN WAR by MAJ John T. Hansen, USA.

This thesis is a study of a tactical combat system. It examines the capabilities of the attack helicopter to determine the suitability of its employment in operations other than war (OOTW). Suitability is established based upon those attack helicopter capabilities most applicable to OOTW. They include mobility, agility, and firepower. Additionally, the attack helicopter possesses a less tangible capability manifest in its effect on the psyche of both sides of the OOTW conflict. Further explanation of this psychological effect resides within this thesis.

This thesis draws several conclusions. First, there is no prescriptive solution with which to determine the need for attack helicopters in a particular operation other than war. Second, in assessing attack helicopter suitability, the commander's analysis of the environment must encompass a "political" analysis which spans the three levels of conflict (tactical, operational, and strategic) tailored in terms of the OOTW environment. Third, while exercising restraint, commander's can employ the firepower capabilities of the attack helicopter in collateral-damage sensitive operations. Fourth, no other tactical combat system combines its capabilities to address the OOTW scenario with the level of synergy as does the attack helicopter. Finally, combat crew training in weapons employment techniques, and research and development of munitions can facilitate the suitable application of the attack helicopter in the OOTW environment.

The majority of the analysis of this thesis focuses on the firepower capabilities of the attack helicopter. This capability separates the attack helicopter from other rotary wing systems. Furthermore the effects of this capability provide the greatest concern for employment in operations other than war.

#### ACKNOWLEDGMENTS

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I also humbly thank the officers and soldiers of the 10th Aviation Brigade, 10th Mountain Division (LI) for both written and oral accounts of their experiences in Somalia.

Finally, my debt of gratitude to my wife, Jeeranant, continues to mount with each milestone I achieve. This paper is no exception and it is to Jeeranant to whom I dedicate this project.

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### Acronyms and Key Terminology

There are several key terms which apply to this thesis defined as follows.

Accuracy - The standard deviation about the mean point of impact of a representative sample of rounds. As the standard deviation increases accuracy worsens.

Aerial Ballistics - Characteristics of aerial fired spin-stabilized or fin-stabilized projectiles.

After Action Review (AAR) - The method employed by units of capturing the results of an operation/exercise with the purpose of learning from mistakes and/or reinforcing standard operating procedures (SOP).

Antiterrorism - Defensive measures taken to reduce vulnerability to terrorist acts.

Area of Operations (AO) - A geographic area assigned to an Army commander by a higher commander. The area of operations is defined by the geographic area in which the commander must project his combat, combat support and combat service support assets.

Area-Target Weapon - A weapon used to engage an area-type target. Weapon that lacks the requisite dispersion and/or accuracy to service a point target and has the blast and burst effects necessary to service an area target.

Attack Helicopter - A helicopter employed as a weapons platform for cannon, missile, and rocket munitions.

Center for Army Lessons Learned (CALL) - The Army's principal vehicle for gathering, analyzing and disseminating lessons learned from all military operations.

Combating Terrorism - Actions including antiterrorism and counterterrorism taken to oppose terrorism throughout the entire threat spectrum.

Counterterrorism - Offensive measures taken to prevent, deter, and respond to terrorism.

Dispersion - The degree of scatter (range and deflection) of rounds within an impact area. As that distance increases dispersion increases.

Folding Fin Aerial Rocket (FFAR) - Unguided rocket munition designed for use against area targets and launched from fixed or rotary wing aircraft. The bursting radius is 10 meters; however, high velocity fragments can produce a lethality radius of 50 meters.

Ground Effect - Aerodynamic phenomenon induced by the airflow through a helicopter's main rotor system. The downward vertical flow of high volume rotor wash created by a hovering helicopter impacts the ground with considerable energy. The ground disperses this high volume column of air in such a way as to add to the efficiency of the rotor system.

Hellfire Missile - Laser guided, chemical energy, helicopter or vehicular launched anti-tank missile used for employment as a point target direct fire weapon against armored vehicles and/or hardened positions.

Maximum effective range - The range at which a weapon or weapons system has a 50 percent probability of hitting (PH) a target.

Mission Essential Task List (METL) - Collective unit tasks essential to the successful accomplishment of the unit's mission.

Milliradian - Abbreviated as mil. A unit of angular measurement equal to 1/6400 of a complete circle. Linear distance between two points is approximated by using the following formula:  $d=r(m)/1000$ , where "d" is the distance between two points (i.e., two impact locations), "r" is the range from weapon or observer to the impact points, and "m" is the distance between the two points measured in mils optically from the observation/fire point.

Multi-purpose Submunitions (MPSM) - A 2.75-inch FFAR warhead containing nine bomblets designed to deploy from rocket casing during flight and descend vertically to the ground to destroy personnel and materiel targets.

Nation Assistance - Military assistance rendered to a nation by foreign forces within that nation's territory during peacetime, crises or emergencies, or war based on agreements mutually concluded between nations.

Operations Other Than War (OOTW) - Operations requiring the use of military capabilities for any purpose other than war.

Peace Enforcement - Application of military force, or the threat of its use, normally pursuant to international authorization to compel compliance with resolutions or sanctions designed to maintain or restore peace.

Point target - Generally any target which occupies 3 dimensional space whose length, width and breadth are each 3 meters or less.

Point target weapon - Weapon used to engage an individual materiel or personnel target. A weapon which possesses the requisite dispersion and/or accuracy to service a point target.

Principle of Objective (OOTW) - Direct every military operation toward a clearly defined, decisive, and attainable objective.

Principle of Unity of Effort (OOTW) - Seek unity of effort toward every objective.

Principle of Legitimacy (OOTW) - Sustain the willing acceptance by the people of the right of the government or of a group or agency to make and carry out decisions.

Principle of Perseverance (OOTW) - Prepare for the measured, protracted application of military capability in support of strategic aims.

Principle of Restraint (OOTW) - Apply appropriate military capability prudently.

Principle of Security (OOTW) - Never permit hostile factions to acquire an unexpected advantage.

Protection of Shipping - The use of proportionate force when necessary for the protection of US flag vessels and aircraft. This protection may be extended to foreign flag vessels, aircraft and persons under international law.

Rules of Engagement (ROE) - Directives issued by competent military authority that delineate the circumstances and limitations under which US forces will initiate and/or continue combat engagement with other encountered forces.

Raid - An operation, usually small scale, involving a swift penetration of hostile territory to secure information, confuse the enemy, or to destroy installations. It ends with a planned withdrawal upon completion of the assigned mission.

Scout Helicopter - Any helicopter regardless of weapons configuration given the principal role of target location and identification and security for accompanying Attack Helicopter during the AH engagement.

Scout Weapons Team (SWT) - Any combination of one or more scout and attack helicopters which operate as a team.

Shows of Force - Operations designed to demonstrate U.S. resolve, which involve increased visibility of U.S. deployed forces in an attempt to defuse a specific situation, that if allowed to continue, may be detrimental to U.S. interests or national objectives.

Silhouetting - Compromising helicopter position in terms of detectability by the enemy due to contrast between the aircraft and its associated backdrop.

Skylining - Silhouetting with the sky as backdrop.

Standard Operating Procedures (SOP) - Documented lists or guidelines employed by units in the conduct of operations in garrison or when deployed.

Support to Counterinsurgency - Support provided to a government in the military, paramilitary, political, economic, psychological, and civic actions it undertakes to defeat insurgency.

Support to Insurgency - Support provided to an organized movement aimed at the overthrow of a constituted government through the use of subversion and armed conflict.

Terminal Ballistics - The characteristics and effects of projectiles at the point of impact. Projectile functioning, including blast, heat, and fragmentation, is influenced by fuse type, warhead type, angle of impact, and surface conditions.

Tube Launched, Optically Tracked, Wire Guided (TOW) Missile - A heavy antitank/assault weapon which may be used against bunkers and similar fortifications. It is capable of being fired from air or ground based systems as a point target, direct fire weapon.

Unitary warhead - Any 2.75 inch rocket warhead which does not deploy submunitions (flechettes, bomblets) in flight.

War - A state of open and declared armed hostile conflict between political units, such as states or nations; may be limited or general in nature.

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## CHAPTER 1

### INTRODUCTION

#### Research Objective and Approach

This thesis is an assessment of the employment of the attack helicopter in Operations Other Than War (OOTW). The problem confronted by this study is based upon in the seemingly contradictory situation of employing a highly destructive combat system in an environment virtually intolerant of collateral damage; an environment which may require delicacy and restraint in weapons systems use.

The relevance of this study is further supported by a brief review of the geo-political/social forces that have given rise to an increased potential for peripheral conflict, and hence US military OOTW. This thesis also presents a brief synopsis of the development of the attack helicopter. The purpose of this synopsis is to demonstrate that the forces which drove attack helicopter development do not exist in OOTW environments. The question of applicability thus arises. Does the attack helicopter, based on its evolved capabilities, have a role in OOTW?

The desired end-state of this paper is to answer the thesis question: *is there a role for the Attack Helicopter in Operations Other Than War?* The thesis uses historical perspective and future conjecture to assist in developing a logical conclusion. The general research approach of this thesis uses comparative analysis. Analysis will answer the following questions:

1. What significant and unique capabilities does the attack helicopter provide forces operating in OOTW?
2. Could other equipment have fulfilled the need driving the employment of the attack helicopter?
3. How effective was the use of the attack helicopter? Why?
4. What constraints were placed on the use of attack helicopters?

#### The Seeds of Conflict Which Set the Stage for OOTW

"Empires may be born in glory, but they always die of embarrassment."<sup>1</sup> At the core of most political troubles in the world we find the ultimate demise of empires. The empires of nineteenth-century Europe established African colonial borders with wanton disregard for ages-old tribal and ethnic boundaries. "Without realizing it, white men largely ignorant of local conditions had just drawn the first lines of modern political Africa . . . ."<sup>2</sup> Colonial African borders divided the Ovambo tribe between Angola and German South West Africa, the Lunda tribe between Zaire and Angola, the Mbunda tribe between Angola and Northern Rhodesia, and the Tutsi tribe between Uganda and Rwanda.<sup>3</sup> European empires denied Africa the natural process of nation building and left her with the unnatural patchwork of modern Africa.<sup>4</sup>

Where European imperialism was the dominant societal phenomenon of the late nineteenth-century, the end of European empires was by far the greatest event of the twentieth-century. Perhaps most astounding was the speed with which empires vanished. The world wars certainly influenced the process and forced many nations to turn within. During the 15 years after the end of the Second World War European, empires from Indochina to West Africa's Atlantic seaboard simply vanished.<sup>5</sup>

Rapidly dissolving empires left indigenous peoples with the daunting mission of coping with, changing or modifying the territorial delineations imposed on their ancient lands. The resulting power vacuums created by the European exodus have given rise to severe civil unrest.

Charlayne Hunter-Gault's (MacNeil Lehrer News Hour) 1992 interview with Rutgers University Professor of African History and native Somali, Said Samitar, opined as to the roots of Somali troubles with familiar findings.

Somali society was founded upon clans led by elders who would periodically gather to make decisions on an ad hoc basis. There was no powerful tribal chief with unquestioned authority. The roots of the [current] tragedy go all the way back to when Somalia was colonized by England to the North and Italy to the South . . . . When the colonial authorities intervened the system, the Somali political system completely collapsed. The Europeans then began to construct these rudimentary skeletal extractions of a centralized state and they left without having completed it. So that when we were thrown, as it were, thrust into independence we were in position of one [system] which we began to understand and we had lost the one we understood.<sup>6</sup>

The "ill-prepared independences bestowed upon states artificially conceived,"<sup>7</sup> find themselves on the slippery slope of finding the solution to their problems in civil and tribal war as summarized by Daniel Spikes in his study of Angola.

These are problems that haunt the world today and stir in the heart of every thinking person the dark foreboding sense that the more the world may change, the more it stays the same.<sup>8</sup>

Ultimately, war has not become obsolete. Nations will resort to conflict to settle their disputes.<sup>9</sup>

Military assistance from world powers (to include the US) to the many new and struggling nations served only to add fuel to the fire by accelerating the proliferation of conventional weapons throughout the third world. The Soviets were particularly proficient in arming

struggling nations. Behind the guise of supporting third world liberation the Soviets kept to their expansionist agenda. Subsequently once the Soviet Union collapsed, its efforts had already armed many third world nations around the globe with modern and lethal weaponry.

International recognition of many new sovereign nations was immediate giving further credibility and legitimacy to the newly established and arbitrary borders developed to accommodate the now-defunct empires. The world inherited the powder keg of modern Africa, and is expected to respond to threats to the sovereignty of these struggling nations in accordance with the United Nations (UN) charter.

My [UN. Secretary General Boutros-Ghali] role is becoming more difficult . . . because of the multiplication of problems: Yugoslavia, El Salvador, Cambodia, Somalia, Angola, South Africa, Mozambique, the UN has never had to deal with six or seven problems at the same time.<sup>10</sup>

The 1945 UN Charter provides the international body with considerable power to take action to prevent and stop aggression. Article 42 empowers the Security Council to take such action by air, sea and land forces as may be necessary to maintain or restore international peace and security.

In response to cease-fires upon which belligerents agreed but refuse to follow, UN Secretary General Boutros-Ghali has urged the Security Council to consider deploying "peace-enforcement units more heavily armed than traditional peace-keeping forces."<sup>11</sup> Success in conducting such operations exists provided we are prepared as advised by Brigadier General S. Malu, Chief of Staff, African Economic Monitoring Group (ECOMOG):

Anyone contemplating something like this [forcibly imposed peace settlement in Liberia] must send enough troops and equipment. Go there just like any other fighting force and defend yourself decisively.<sup>12</sup>

At the combat fighter level are the echoes of General Malu's opinion. "It takes just one person with a gun to get you killed. It doesn't matter how ragtag they are."<sup>13</sup> As such, all of the considerations of Mission, Enemy, Terrain, Troops and Time (METT-T) must apply. In preparing for OOTW, however, it is necessary to add "political" to that list (METT-T-P). As will be presented later in this thesis, the commander must conduct his traditional METT-T analysis and temper it with the political ramifications of his unit's actions. He must exercise restraint while not exposing his own forces to grave danger.

After combat operations started (after 5 June 1993), occasionally the ROE would change to suit what appeared to be the political climate or reactions to CNN news coverage.<sup>14</sup>

There is real danger in focusing too closely on either the traditional (METT-T) or on the political considerations. Over focusing on the former ignores the sensitivity of the overall political end-state and may ultimately defeat the purpose of the mission and prolong military involvement. Over focusing on the latter breeds indecision and hesitation which may endanger troops and result in loss of national will or popular support at home.

#### Current Conditions (OOTW)

Is OOTW a real concern for all US forces?

Admiral Paul D. Miller [Commander, US Naval Forces, Operation UPHOLD DEMOCRACY, Haiti] said missions that fall somewhere between war and civil service employment "will be in the calculus for the military ahead."<sup>15</sup>

The geopolitical turmoil present in today's world order is a harbinger of unrest and strife which may require military solutions and settlements. Political and ethnic sensitivities run high. As such, military commanders who find themselves in OOTW will have to tailor operations to accommodate a sensitive ethnic and/or political situation.

Military forces will operate while walking on "political eggshells." Forces must enter the OOTW theater with a thorough knowledge of why they are there from a socio/political standpoint. They must employ weapons and manage violence accordingly as determined through METT-T-P analysis.

The post-Cold War world continues to be a dangerous place. The potential for hostility exists virtually everywhere. There is a growing expectation of US political and military involvement to quell this violence from the world community as well as from home fueled, in part, by the media. In his study of peacekeeping, Ian Kemp of the Royal United Services Institute for Defense Studies (RUSI) contends that hostility is omnipresent, albeit often repressed.

The seething mass of ambition and potential violence so characteristic of international relationships is contained in quieter times behind a thin shell of a veneer.<sup>16</sup>

That 'shell' is made weaker by the de-polarization of the world between East-West superpowers as illustrated by Colonel David M. Glantz of the Foreign Military Studies Office, Fort Leavenworth, Kansas, in a 1991 Military Review article.

Today . . . [the] US-Soviet context has eroded and has been replaced by the uncertainties of a multi-polar world subject to the divisive forces of ethnic unrest on an unprecedented scale. Civil war in Yugoslavia represents in microcosm the kinds of problems requiring urgent solution if a new global order is to be established and stability is to be restored.<sup>17</sup>

In many regions of the world the "veneer" is cracked or broken.

The stability of a bi-polarized global power relationship ended with the end of the Cold War. When the Soviet Union dissolved as one of two global superpowers, the power relationship shifted from bipolar to multi-polar. Its collapse signaled the Soviet Union's loss of control over Eastern Europe and left a security vacuum throughout Eastern Europe and various Soviet-aligned states throughout Asia and Africa. The tense state of peace based on well-understood rules and procedures vanished.

Slack in the Soviet grip revived internal and external animosities and tensions that had characterized pre-Cold War Eastern Europe.<sup>18</sup>

The decay of Soviet power catalyzed the resurgence of long-standing national hostility in Central Asia as well. The once traditional Indian-Soviet alliance that counterbalanced the Chinese-Pakistani alliance is significantly weakened. Internal and ethnic strife and tension in Afghanistan, Sri Lanka, Myanmar, Cambodia, Malaysia and Indonesia, and indigenous narcotics trafficking in Thailand, Laos and others abound in the once Soviet dominated region.<sup>19</sup> Colonel Glantz highlights still another effect of multipolarity; economic instability.

[Simultaneous to] the collapse of communism in Eastern Europe . . . a technological revolution promised to accord smaller nations the ability to contest both militarily and economically (at least locally) with world military powers. Revitalized ethnic and religious forces began challenging traditional power elites . . . and the emerging power of multinational economic organizations further blurred the hitherto fairly clear lines of economic authority.<sup>20</sup>

These nations transcend regions within US national security interest.

The growing destabilizing threat of drug trafficking and narcotics proliferation forces nations to conduct military operations to counter this problem. Eastern Europe is especially vulnerable due to the relaxation of the Soviet grip. International organizations that foster narcotics trafficking now threaten the East European region.<sup>21</sup> However, the problem is even more pervasive in our own hemisphere.<sup>22</sup> So much so that President Bush declared war on drugs. Combating this problem has been an essential element of the US National Security Strategy since.

Perhaps the most tragic conditions ripe for OOTW exist in Africa. "Africa . . . is beset by recurring and persistent economic crises, ethnic strife (the horn of Africa and South Africa), and

religious fundamentalism (the Mahgreb).<sup>23</sup> African "basket case" nations may continue to see soldiers from around the world conducting OOTW to restore peace. In the nearby Middle East, religious and ethnic hatred exacerbate political differences. Colonel Glantz purports that the solution to problems there "remain a riddle that only the collective agreement of world powers and the nations in the region can solve."<sup>24</sup> Even a cursory study of the area supports his statement. The technological revolution in weaponry equips these troubled nations with the ability to threaten stability and to actively challenge the UN or other nations that attempt to regain regional stability.<sup>25</sup>

US support of the UN and desire to protect vital national interests will likely result in confrontation with obscure, poorly defined threats as we conduct operations outside the scope of open warfare. These threats will be capable of inflicting casualties on friendly forces regardless and often in spite of the nature of the OOTW operation. These casualties will not be large in numbers, but may be significant enough to de-spirit National will and discontinued OOTW involvement. The potential for withdrawal prior to mission completion rapidly increases. The former Supreme Allied Commander, NATO, General Shalikashvili acknowledges the dangers of keeping the peace.

The days of pristine peacekeeping as we understood it for years are probably over. Prudence dictates that in our planning we take that aspect of combat into account.<sup>26</sup>

This concern has driven adaptation of OOTW into current doctrine. US Joint Operations doctrine (draft) attempts to define objectives and priorities of conducting UN or unilateral operations in an OOTW environment through to its successful end. That doctrine is founded upon six principles. These principles are security, objective, perseverance, legitimacy, and restraint. The last two principles

present the commander with the challenges of employing attack helicopters in OOTW; as will be discussed throughout this thesis.

#### Attack Helicopter Development, Evolution of Capabilities

Since its introduction to the modern battlefield, the helicopter has played a vital role as a key member of the combined arms team. A 1986 Whitehall Paper, study of military helicopters, acknowledges the helicopter's impact upon military operations and hints at possible future use.

No weapon system has had a greater impact on the operations of the United States Army since the Second World War than the helicopter . . . Army aviators believe helicopters would introduce greater mobility to both conventional operations and counter revolutionary warfare.<sup>27</sup>

From its little known combat debut in World War II Germany, through the force buildup of the Cold War, and to the high-intensity combat of Desert Storm, the helicopter has provided an essential element of versatile combat power to ground maneuver force commanders. The helicopter has revolutionized modern warfare by exploiting the third dimension of the battlefield and by providing the commander with a potent, mobile weapons system, whose physical movement is uninhibited by the surface-conditions of the terrain. The capabilities are significant. "The freedom of movement and speed . . . attributed to helicopters provides commanders with an unprecedented degree of tactical mobility."<sup>28</sup> Mobility was the sought after capability which drove helicopter development. The continued need for helicopter mobility in OOTW is assessed in Chapter 3.

The idea of arming helicopters was considered shortly after the first helicopter took flight. In Germany during World War II the world saw the first armed helicopter. The US and USSR, however, only briefly considered the armed helicopter concept then discontinued development.<sup>29</sup>

Interest in an armed helicopter was rekindled after the start of the Korean War in June 1950. This conflict brought to a new light the helicopter's potential for mobility and added agility to its capabilities.

There are no superlatives adequate to describe the general reaction to the helicopter . . . . No effort should be spared to get helicopters . . . to the theatre at once - and on a higher priority than any other weapons.<sup>30</sup>

At this time there were no armed helicopters in the Army inventory. Progress toward the development of an attack helicopter continued slowly.<sup>31</sup>

French efforts added firepower to the capabilities of the helicopter. They were the first to effectively employ an armed helicopter.<sup>32</sup> In 1954, soon after the outbreak of the seven year war in Algeria, the French employed helicopters in the assault-troop carrying role. To protect the assault-troop-carrying helicopters, the French developed the armed escorting helicopter. Its weapons provided direct fire support designed to engage potential hostiles in the vicinity of the landing zone or while enroute. These helicopter-borne armaments were area-target weapons designed for high volume and dispersion, not for pin-point accuracy.<sup>33</sup>

The US took notice of French successes in Algeria. In 1958 the US created an experimental Aerial Combat Reconnaissance Company (ACR).<sup>34</sup> Secretary of Defense Robert McNamara instructed Lieutenant General Hamilton Howze to accelerate the introduction of the helicopter into the force. Howze sought to exploit the helicopter's speed and mobility by adding firepower to its capabilities. He acknowledged the need for further development of a dedicated attack helicopter. Development would begin after US forces began deployment to Vietnam.<sup>35</sup>

The vulnerability of the helicopter to ground fire as discovered by the French in Algeria, was confirmed in Vietnam by US forces. US forces applied the stop-gap solution of mounting weaponry to an existing platform. That weaponry would send a wall of lead at any potential threat.<sup>36</sup> Unfortunately, armed utility helicopters were unable to carry cargo or troops. Excessive weight limited maneuverability and speed to the extent that once an escort left the formation to suppress a target it could not rejoin the formation.<sup>37</sup> Furthermore, fixed-wing fighters could provide only limited support. The Army needed an attack helicopter with the requisite speed and firepower to provide dedicated and continuous "close air support" for heliborne operations.<sup>38</sup> US attack helicopter development continued in earnest. The potential of armed helicopters demanded further development. COL E. H. Grayson,

[T]he inherent mobility and flexibility of the helicopter provides a much greater capability to concentrate this firepower over and over again, wherever needed on the battlefield.<sup>39</sup>

By 1967 the Bell Helicopter AH-1 Huey Cobra helicopter gunship made its maiden flight.<sup>40</sup> It was fast, intimidating, and powerful.<sup>41</sup> It was an excellent escort aircraft; responsive and relatively agile. As such, agility was added to the lengthening list of helicopter capabilities.

The success of the AH-1 in Vietnam convinced the Army that it needed a dedicated Attack Helicopter in its inventory. However, the Army had not fully realized the attack helicopter's potential. Realization would come with the mounting of vehicle launched Antitank Guided Missiles (ATGM) to attack helicopters.

The advent of the antitank guided missile (ATGM) propelled the attack helicopter to modern day capabilities. Armed with guided missiles, the attack helicopter could deliver lethal munitions directed against point targets. In his review of the Army Aviation, Colonel E.

H. Grayson highlights the synergistic effect of combining the ATGM with a highly mobile platform. "Missile armed helicopters offered a priceless advantage: the ability to move across all terrain at high speed, to respond to sudden changes in the tactical situation."<sup>42</sup> Armed with a point target munition, the attack helicopter could challenge the tank.

Throughout the Vietnam era, the Warsaw Pact developed an overwhelming numerical superiority in main battle tanks. The result was a steadily growing Warsaw Pact advantage over NATO in armor forces. A missile-armed attack helicopter in the antitank role could achieve high kill ratios against tanks by engaging tanks beyond the range of their weapons. Antitank helicopters brought force parity back to the Western Europe cold war theater. The US reconfigured AH-1s with wire guided TOW missiles and deployed them to Europe. The attack helicopter added versatility to the accuracy and standoff capability of the ATGM.<sup>43</sup> But the AH-1 design was built upon the utility helicopter's design. The Army sought a pure attack design.

In 1972 bidding went out for the development of the Advanced Attack Helicopter (AAH). The winner was the Hughes AH-64 Apache.<sup>44</sup> The capabilities of the AH-64 are significant. In the opinion of Colonel W. D. McGlasson (ARNG), "The Huey [UH-1] was to the Apache as the spear to the M-16 rifle."<sup>45</sup> The Apache was designed from start to finish as a dedicated antitank attack helicopter; it has no troop or materiel lift capability. Although its specialty is knocking out tanks, the Apache performs suppression, escorting, and reconnaissance missions with great credibility.<sup>46</sup> It is an "integrated system for battle" focused on destroying armor.<sup>47</sup> But most significant is its potential kill ratio of 16:1 (16 tanks destroyed for every AH-64 destroyed). The AH-64 was perhaps one answer for the looming Warsaw Pact armor threat.

Today's US Army inventory of attack helicopters is extensive. When fully implemented, the Aviation Restructuring Initiative (ARI) will include 808 attack helicopters in Active Component (AC) structure and an additional 432 in the Reserve Component (RC).<sup>48</sup> Other NATO nations have considerable inventories of attack helicopters as well. The Coalition of Independent States (CIS) inventory of MI24 attack helicopter variants exceeds 1,700.<sup>49</sup> The Cold War ended leaving world powers armed with this equipment as part of its legacy. The specter of armor battles on the North German Plain and elsewhere as East battled West has all but vanished. Doubtless, the existence of NATO attack helicopters assisted in bringing forth the cold war's end, and were, therefore well worth the money spent. The attack helicopter's value in high-intensity conflict cannot be overstated. Recent AH64 and AH-1 performances in Operations Desert Shield and Desert Storm attest to the attack helicopter's worth; but what of the less intense and equally dangerous future? Are these tank killers necessary now? Can they be employed in OOTW? If attack helicopters had a role in OOTW, nations could further realize a benefit to the vast amounts of resources spent on development and procurement of these systems. The answer is determined by the degree of utility, and the applicability of the capabilities of the attack helicopter in the prevailing hostile environments of today and tomorrow -- OOTW environments. In essence, the attack helicopter must satisfy a feasibility, acceptability, and suitability (FAS) test for employment in OOTW.

#### The Attack Helicopter in OOTW

Operations Other Than War (OOTW) encompass the use of military capabilities for any purpose other than war. Operations other than war have significantly different objectives from war.<sup>50</sup> Although not

totally divorced from using combat power, OOTW differs from war in the application of combat power. The requirement to destroy the enemy's warfighting capability defines the level of combat power necessary during war. In OOTW, combat power ranges from "not applicable" to "carefully regulated" by Rules of Engagement (ROE). Nations engage in war when political efforts fail. In OOTW political objectives drive military decisions from the strategic to the lowest tactical level. Furthermore, events at the lowest tactical level can have instantaneous impact at the highest strategic level. Deviation from established ROE can have strategic impact and jeopardize an entire operation. Like any tactical weapon system there is much potential for attack helicopters to inadvertently deviate from ROE. The latter two characteristics of OOTW (ROE and political influence) juxtaposed with the characteristics of the attack helicopter (maximum destruction) form the basis of the problem to be answered by this thesis.

The United States' war arsenal includes potent/destructive equipment and lethal ordnance. Attack helicopters are such equipment. By their nature the weapons employed by attack helicopters carry the risk of producing collateral damage. In OOTW, collateral damage can be catastrophic to those we seek to help and to the mission. Excessive collateral damage, actual or perceived, violates restraint and weakens legitimacy. Use of attack helicopters and their lethal ordnance in OOTW thus becomes analogous to squashing an ant with a sledgehammer and probably hitting your toe. That is, more unintentional damage may be done to political resolve, infrastructure and the will of the people than damage to the target. Nonetheless, the benefit of surgically employing heavy equipment and lethal ordnance with the requisite control to render it effective and functional in various OOTW scenarios is intriguing. Attack Helicopters, in particular, may allow such a vision.

Throughout the text of this thesis various past OOTW operations are cited to support the comparative nature of this analysis. All cited operations included the employment of attack helicopters. A cursory review of these operations follows. This review briefly highlights the mission, enemy, terrain, political considerations, and the ultimate outcome of each of these operations. As this thesis focuses only upon the effects of the attack helicopter as a combat system, troops and time available (remaining factors of METT-T-P) are irrelevant. Table 1 summarizes this data.

The study of each of these operations is worthy of a separate thesis. As such, the brief outline of each operation in table 1 can not attempt to provide full detail and description, but is included here to provide some background on the event to assist the reader.

TABLE 1  
ATTACK HELICOPTERS IN OOTW

Location	Type Operation	Duration	Attack Helicopters Present
Grenada	Attack/Raid	25 Oct to 2 Nov 1983	AH-1T (USMC) AH-6 (SOAR) *
Afghanistan	Counter-insurgency	24 Dec 1979 to 15 May 1988	Mi-24
Panama	Attack/Raid	20 Dec 1989 to 31 Jan 1990	AH-1F, AH-64 AH-6 (SOAR) *
Iraq	Humanitarian Assistance	Ongoing	AH-64
SW USA	Counter Drug	Ongoing	AH-64
Somalia	Humanitarian Assistance/ Show of Force	3 Dec 1992 to 4 May 1994	AH-1F AH-6 (SOAR) *
Haiti	(Attack/Raid) Nation Assistance	Ongoing	AH-1F

\*Analysis of Special Operations Aviation Regiment (SOAR) operations is beyond the scope of this thesis.

### Grenada (URGENT FURY)

Mission. The United States objectives were as follows: to protect US citizens; to facilitate the evacuation of those who want to leave, and to help in the restoration of democratic institutions in Grenada.<sup>51</sup>

Enemy. The People's Revolutionary Armed Forces (PRAF) was the Cuban-supported enemy. The PRAF was composed of five infantry battalions, 2 motorized/mobile infantry companies, one armored cavalry platoon, two ZU 23 anti-aircraft companies, one mortar battery, two 12.7mm anti-aircraft platoons, and Cuban construction engineers.<sup>52</sup>

Terrain. Grenada is a mountainous island nation. Much of the area of operations included urban terrain. Initially operations were seaborne.

Political Considerations. Marxist deputy prime minister assumed power after executing the prime minister. A majority of the population (85%) welcomed US intervention as a form of rescue mission.<sup>53</sup>

Attack Helicopter Operations. Operations included fire support for ground maneuver operations.

Outcome. The outcome of URGENT FURY is best summarized by Stanley Arthur, former British high commissioner in Barbados.

The joint US-Caribbean intervention in Grenada removed . . . a totally unrepresentative and highly unpopular armed faction, which had no claims to legitimacy, and could only be described as having hijacked the island in the wake of Bishop's [Prime Minister] murder. The temporary occupation of Grenada restored the right of the people to choose their own government, and at the same time removed what was seen as a major threat to the stability of the region.<sup>54</sup>

### Afghanistan

Mission. The mission of Soviet forces in Afghanistan was originally similar to that in Czechoslovakia. It included elaborate deception, subversion of an unreliable communist government (Amin

regime), and replacement of that government with more reliable comrades (Karmal regime). As Soviet troops entered Kabul, Soviet diplomats announced to the world that "[Soviet Union is] responding to an appeal from the Afghan leadership to repel outside aggression."<sup>55</sup> This political half-truth ironically would come to fruition. The Soviet military would eventually assist the emplaced government to counter guerrilla insurgency.

Enemy. The principle enemy encountered by Soviet forces were guerrilla Freedom Fighters. The Freedom Fighters adjusted their composition and tactics to make the most effective use of the mountainous terrain. As a result the principle threat to the Soviet Heavy forces was a lightly armed elusive enemy who maximized the use of terrain to his advantage. Armored forces were virtually useless against such an enemy. The Soviets in 1981 began to employ Western-style counterinsurgency tactics.<sup>56</sup>

Terrain. Afghanistan is largely a vast expanse of extremely rugged terrain ranging from desolate, rocky deserts to mountains rising higher than 25000 feet in some places. The conditions are excellent for conducting guerrilla warfare. Narrow and winding roads which cut through steep valleys did not permit effective employment of the Soviet's heavy mechanized forces.<sup>57</sup>

Political Considerations. The emplaced Karmal government was plagued by party infighting. Past torture and political persecution at the hands of new found "colleagues" created personal feuds within the Kabul politburo. Factional disputes permeated through the people as well. One such faction sporadically fought alongside the mujahidin. In short, Soviet assistance in the Afghan counterinsurgency met obvious resistance from the Mujahidin and sporadic resistance from a segment of

the Afghan people. Both were equally as unidentifiable throughout the area of operations (AO).

Attack Helicopter Operations. Operations included fire support for ground maneuver operations and independent attacks and raids.

Outcome. After nine years of counter-insurgency operations the Soviet forces withdrew from Afghanistan. Change in Soviet leadership (Gorbachev) brought a change in Soviet foreign policy with priority to US-Soviet relations. Upon withdrawal insurgent forces continued to fight the Afghan government. Tom Rogers summarized the Soviet withdrawal in his study of the event.

The Soviet retreat from Afghanistan, therefore, must be understood in the overall context of changes in Soviet foreign policy. Although the Afghan resistance was a formidable adversary to Moscow, it was only one element contributing to changes in the Soviet policy toward Afghanistan.<sup>58</sup>

#### Panama (JUST CAUSE)

Mission. The mission of Operation JUST CAUSE was to conduct an attack/raid to eliminate the corrupt Panamanian Defense Force (PDF), eliminate the Noriega regime, secure Panama canal facilities, protect American lives, restore the democratically elected Endara government, and minimize damage and civilian casualties.<sup>59</sup>

Threat. The principle threat was the PDF which included a cavalry squadron, seven infantry companies, separate infantry battalion, and several paramilitary battalions.<sup>60</sup>

Terrain. Operation JUST CAUSE included 28 targeted assault points. These targets were located in either urban or densely vegetated terrain. Targets were located across the isthmus and on both sides of the canal.

Political Considerations. The Noriega regime became increasingly hostile and brutal to much of the population. Vindictive

arrests, beatings with rubber hoses, and late night visits by PDF thugs characterized the sadistic nature of Noriega's dictatorship. Demonstrations were quickly stifled by aggressive and zealous PDF forces.<sup>61</sup> Popular support from the majority of Panamanians was reasonably assured. However, with much of the fighting in urban terrain, popular support could quickly wane from damage and death to civilians. The Air Force Chief of Staff at the time, General Welch, warned also of support for Noriega.

Fourth [problem], Welch said, was the David and Goliath problem - the real possibility that popular feeling, due partly to the impact of the media in this country, would see Noriega as the little guy, unfairly overwhelmed.<sup>62</sup>

Attack Helicopter Operations. Operations included fire support for ground maneuver operations and air assault/air mobile operations.

Outcome. The military combat activities in Panama concluded successfully with all objectives met. Damage to the Panamanian infrastructure and the effects on the civilian population were severe. An estimated 202 Panamanian civilians died, and at least 10,000 were left homeless. In their review of the operation Donelly, Roth, and Baker conclude that, "Even considering the loss of life and livelihood, most Panamanians will say 'yes, the invasion was worth it.'"<sup>63</sup>

#### Northern Iraq (PROVIDE COMFORT)

Mission. President Bush directed that a relief effort to include air-delivered relief items and medical support be initiated along the Turkish-Iraqi border to aid the fleeing Kurds.<sup>64</sup> The mission, therefore, included the building of shelters and distribution of supplies, ensuring of order, and providing security throughout the AO. Security was essential to encourage the Kurds to move from the mountains back to their homes.

Enemy. Principle enemies included potential confrontation with deployed Iraqi forces. The environment also posed dangers to the effort in the form of numerous unexploded ordnance throughout the AO which impeded relief efforts.

Political Considerations. Operation PROVIDE COMFORT was borne from post-desert-war brutality of the Hussein regime directed against Iraq's ethnic Kurds. Hussein's forces drove the Kurds from their homes into the mountains bordering Turkey. PROVIDE COMFORT is principally a humanitarian assistance operation. The need for combat power is not readily apparent. As such, application of combat power is lashed to political consideration particularly in the realm of world opinion.

Attack Helicopter Operations. Operations included reconnaissance and fire support for ground maneuver operations limited to show of force and force protection.

Outcome. Mission is ongoing with success reported to date.

#### South West America (JTF BRAVO)

Mission. The primary mission of JTF BRAVO is to support counterdrug operations along the US border with Mexico. The mission of the supporting attack helicopter battalion was, "to conduct recon and security operations along the US/Mexico border . . . in support of the United States Border Patrol."<sup>65</sup> The specific military intent is to: "Provide the [United States Border Patrol] USBP with timely and accurate assistance in detection, monitoring, and tracking suspected illegal border crossings and contraband smuggling."<sup>66</sup>

Enemy. The threat stems from a multitude of opportunists seeking to cross the border with illegal contraband while remaining undetected and avoiding any contact with authorities. The threat

carries few weapons and will usually drop their contraband and run if detected.

Terrain. The terrain includes over 197 statute miles of scrub brush desert with a network of canyons and trails. Smugglers penetrate the border to drop-off locations then return to Mexican territory.<sup>67</sup>

Political Considerations. US law (Posse Comitatus) clearly limits the use of the military in such operations. Concerns for Mexican sovereignty further restrict the use of military force. There is no tolerance for border violations.

Attack Helicopter Operations. Operations included reconnaissance support for USBP operations.

Outcome. Mission is ongoing with success reported to date.

#### Somalia (RESTORE HOPE)

Mission. Although operations in Somalia fell under two distinct phases, support for RESTORE HOPE (December 1992 to May 1993) and UNOSOM II (May 1993 to March 1994), the overall mission remained to provide security and humanitarian assistance to the people of Somalia. The deployed attack helicopter units conducted reconnaissance, attack helicopter operations, air assault, and general support operations in support of US and Coalition forces.<sup>68</sup>

Enemy. Adversity within Somalia included the great distances relief convoys were required to travel. The lack of infrastructure or any recognizable government authority compounded the problem of factional fighting. There were six major factions in Somalia, all moderately armed.

Terrain. Somalia is an arid country which receives less than 20 inches of rain per year. Most of the country is desert and scrub-brush plains. In the North, mountains rise inland from the coastal strip.<sup>69</sup>

Political Considerations. The Somali people are a homogeneous population with few ethnic groupings. Six clan families organized over the course of the country's development. Factional fighting is defined by these families. Somali societal norms recognize strength and show little respect for charity. The very notion of a strong nation such as the US entering the country to help the Somali people is foreign to them. They would more readily understand an invasion to conquer than humanitarian aid and support.<sup>70</sup> Professor Samitar adds,

Extreme individualism in the political culture. It is practically impossible for one Somali to command the allegiance of another Somali. Everyone is king unto himself.<sup>71</sup>

Attack Helicopter Operations. Operations include fire support for ground maneuver operations and limited air assault operations, and independent attacks and raids.

Outcome. The objectives of stemming the massive starvation throughout the nation were met. However the entire operation was fraught with tactical failures and a new phenomenon known as mission creep. United Nations operations have ceased. The future of the Somali people is grim as anarchy remains and factions struggle for dominance.

#### Haiti (UPHOLD DEMOCRACY)

Mission. The initial military goals in Haiti were to conduct an invasion of the island nation to set the stage militarily and politically for the return to power of the democratically elected President Aristide. Last minute negotiations lead by former President Carter changed the aims of the operation.

The initial aims of the operation were ensuring the Haitian armed forces and police comply with the Carter-Cedras accords; protection of US citizens and interests, designated Haitians, and third country nationals; restoring civil order, assisting in the reorganization of the Haitian armed forces and police, and assisting in the transition to a democratic government.<sup>72</sup>

Enemy. Haitian Armed Forces (FAd"H) and security forces totaled 8,100 active duty personnel. Additionally 1300 civil police were potentially hostile. The FAd"H included five infantry companies, and an independent heavy weapons company equipped with mortars, armored vehicles, and artillery.<sup>73</sup>

Terrain. Haiti is made up of extremely mountainous country and is virtually deforested. Key urban areas in Haiti include Cap Haitien, Port-au-Prince, and Cayes all located in close proximity to the Haitian coast. "The Republic of Haiti has 28,000 square kilometers of mostly mountainous terrain, lacking a usable road network."<sup>74</sup>

Political Considerations. Health conditions and general living conditions in Haiti were appalling. While there was no starvation, a majority of the population, especially the young, suffer from ill-health due to mal-nutrition, poor sanitation, poor diet, and a lack of available medical care and pharmaceuticals. The life expectancy in Haiti is 52 years. Thousands of Haitians have risked death to leave their troubled country by small craft. Generally, the Haitian people are dissatisfied with the condition of their lives and their country.

At the time of the launching of portions of the invasion force (10th Mountain Division) the JTF leadership expected resistance from uniformed military and paramilitary, and from some armed civilians.

Attack Helicopter Operations. Operations included fire support for air assault/air mobile operations and limited ground maneuver operations.

Outcome. President Aristide returned to power. Nation assistance operations are still ongoing.

### Delimitations

This study is one of a tactical combat system. It will not address collective training, collective employment, doctrine, or force structure.

OOTW ranges the potential-for-combat spectrum from strikes and raids to non-combat. A reasonable assumption is that the National Command Authorities (NCA) will consider employment of attack helicopters only into those operations with the greatest potential for combat operations. As such, no particular OOTW problem from the growing list of problem-types are analyzed for attack helicopter employment applicability. The decision to deploy attack helicopters may remain at NCA level if political sensitivity warrants. The decision to employ attack helicopters is a command decision. Regardless of the level to which that decision is delegated, the commander determines his requirements based upon METT-T-P and NCA guidance and directive. He decides which weapons systems capabilities apply to the AO.

Attack helicopters evolved during the Vietnam war era as discussed in this chapter. During the Vietnam conflict, the attack helicopter as we know it today was more of a concept than a combat system. While the political climate and physical geography of the region is sited herein, this thesis will not draw significantly from observations and lessons regarding attack helicopter employment in Vietnam.

The scope of this thesis is limited to conventional forces. Special operations forces and capabilities are not discussed. The intent is to provide information through an analytical approach as to the employment of conventional forces. Special operations aviation forces inherently conduct low intensity and clandestine operations. Their equipment is tailored to perform such missions. The hasty

conclusion may be to equip conventional forces with similar equipment. Cost involved and required structure/doctrine changes invalidate this option. This paper analyzes the feasibility, suitability, and acceptability of employing the capabilities of the conventional force attack helicopters in OOTW.

#### Endnotes

<sup>1</sup> Daniel Spikes, Angola and the Politics of Intervention (North Carolina: McFarland & Company, 1993), xiii.

<sup>2</sup> Ibid. 5.

<sup>3</sup> Ibid. 5-6.

<sup>4</sup> Ibid. 6.

<sup>5</sup> Ibid. 9.

<sup>6</sup> Said Samitar, Interview with Charlayne Hunter-Gault, "MacNeil Lehrer News Hour, PBS Video, 2 December 1992.

<sup>7</sup> Ibid. xiv.

<sup>8</sup> Ibid. xiv.

<sup>9</sup> COL David M. Glantz, "Challenges of the Future, Developing Security Issues in the Post-Cold War Era," Military Review, 12, (December 1991; rpt. Foreign Military Studies): 9.

<sup>10</sup> U.N. Secretary General Boutros-Ghali during an address to the U.N. in session. Spikes, 22.

<sup>11</sup> Ian Kemp, "Peace Keeping Between the Battle Lines," Jane's Defense Weekly, International Edition (13 March 1993): 23. Hereafter referred to as "Kemp."

<sup>12</sup> Said Malu as quoted in Spikes, 18.

<sup>13</sup> Matthew Hedenskoog, 10th Mountain Division (LI), quoted in "Cheering crowds welcome U.S. troops in Haiti," The Kansas City Star, 20 September 1994, A-8.

<sup>14</sup> Michael Gawkins, Lessons Learned From Somalia, C/2-25 ATKHB, 22 April 1993 - 30 August 1993, Ft. Drum, New York: 10th Mountain Division, 1993.

<sup>15</sup> William Matthews, "Haiti Planner: Troops ready to be helpers," Army Times, 31 Oct 1994, p 26.

<sup>16</sup> Kemp, 23.

<sup>17</sup> David M. Glantz, "Challenges of the Future, Developing Security Issues in the Post-Cold War Era," Military Review, 12, (December 1991; rpt. Foreign Military Studies): 9.

<sup>18</sup> Ibid. 4.

<sup>19</sup> Ibid. 9.

<sup>20</sup> Ibid. 3.

<sup>21</sup> Ibid. 3.

<sup>22</sup> The persistent and spreading problem of narcotics production and trafficking threatens economic and social stability in North America. Insurgencies, ethnic conflict, economic problems and narcotics production and trafficking in Latin America continue to pose great challenges for selected nations and their neighbors. Ibid. 7.

<sup>23</sup> Ibid. 8.

<sup>24</sup> Ibid. 8.

<sup>25</sup> Ibid. 8.

<sup>26</sup> John Shalikashvili, SAC, NATO, quoted in Kemp, 23.

<sup>27</sup> Farooq Hussain, Ian Kemp, and Philip McCarty, "The Future of the Military Helicopter," Whitehall Papers (Royal United Services for Defense Studies, 1986): 16.

<sup>28</sup> Ibid. 10.

<sup>29</sup> The German Focke-Achgelis Fa-223 Drache was a six-seat transport helicopter. In 1944 the Wehrmacht armed the Fa-223 with a 7.62mm MG-15 machine gun flexibly mounted in the nose of the aircraft. E. J. Everett-Heath, "The Development of Helicopter Air-to-Ground Weapons," International Defense Review, (March 1983): 321.

<sup>30</sup> L. C. Shepard, Jr, quoted in Ibid.

<sup>31</sup> The Army made several attempts at arming the helicopter with rockets and grenades to further capitalize on its mobility and agility. The general instability and high vibration of the helicopter made arming it a formidable task. Sighting requirements, weapon bulk and recoil added to the problem. Furthermore, the Army gave little thought to the tactical employment of an armed helicopter other than that they would provide the commander with a mobile source of fire power. By the end of the war little progress was made. Ibid. 321.

<sup>32</sup> Armament consisted of two 68mm rocket pods with 18 rockets each, .30 caliber machine guns mounted under the fuselage and a 20mm cannon secured to a flexible mount in the cabin door. Ibid. 322.

<sup>33</sup> Fixed-wing fighters and bombers supported heliborne assaults. Fighters and bombers provided preparatory fires to clear landing zones. Algerian rebel forces began to time their counter-attacks into French LZs to begin after fighters and bombers were gone and when helicopters arrived. The French solution to fill the fire power gap created by departed fighter/bomber support was to arm one helicopter to escort the troop carriers. This escort could provide defensive fires while enroute, suppressive fires while in the LZ, and covering fires for infantry after they deplaned. In 1959 the French carried 300,000 troops into combat in escorted helicopters without a single loss to ground fire. Armed helicopter effectiveness was becoming clearly evident. Ibid. 322.

<sup>34</sup> Rockets damaged or destroyed their pods during firing. Machine guns, mounts and ammunition presented significant weight problems. The ACR mounted and test-fired .30 and .50 caliber machine guns as well as rockets of varying size on a variety of helicopters.

The tests revealed several difficulties. In spite of lack-luster armed helicopter trials, the US Army sought to exploit the helicopter's speed and mobility, and to add firepower to her helicopters' capabilities. Further experimentation with weaponry continued and would be put to good use in the ensuing Vietnam War. Ibid. 322.

<sup>35</sup> By 1962 the Army added 97 helicopters to the division force structure. The helicopter mission focused on troop equipment airlift. Howze recommended the development of five Air Assault Divisions each with 459 light and medium lift helicopters. The resulting Division structure included 428 UH-1 and CH-47 helicopters with enough lifting capability to lift all of the Division's troops and equipment. Hussain, Kemp, and McCarty, 8.

<sup>36</sup> Weapon mounted utility helicopters provided suppressive fires. Similarly to French success in Algeria, the employment of armed escort helicopters significantly reduced the number of escorted helicopters lost to enemy ground fire. However, this solution was only marginally acceptable since it diverted utility aircraft from their primary mission and degraded their flight performance. Ibid. 9.

<sup>37</sup> Everett-Heath, 323.

<sup>38</sup> After a brief debate with the Air Force on roles and missions the Army submitted its formal proposal and specifications for an Attack Helicopter in 1964. Hussain, Kemp, and McCarty, 9.

<sup>39</sup> E. H. Grayson Jr., "Army Aviation 1984 to 2015," U.S. Aviation Digest, (November 1984): 3.

<sup>40</sup> Bell based the Cobra design around its UH-1 engine and drive train. The Cobra had a new slim-line fuselage which placed the pilot in tandem seating behind the gunner. Ibid. 9.

<sup>41</sup> AH-1 aircraft configured only with rockets performed the Aerial Rocket Artillery (ARA) mission. In 1967 the Cobra made its debut in Viet Nam. Armament included a chin turret which could incorporate miniguns, cannons and/or grenade launchers. Four pylons could accommodate rockets or gun pods. Armed with rockets, a single AH-1 became the firepower-equivalent of a battery of 105mm howitzers. Ibid. 9.

<sup>42</sup> The French were the first to employ guided missiles from helicopters. They mounted wire guided SS10 missiles on their helicopters and successfully employed them in Algeria. Nord Aviation SS-10 and SS-11 wire guided missiles were installed for firing into overhanging cliffs and other inaccessible targets. Ibid. 323.

<sup>43</sup> Eventually, the cost to NATO in achieving armor force parity with the Warsaw Pact became prohibitive. These developments were at the heart of the reason for developing a dedicated tank killing helicopter. The solution demanded a weapon system with the potential of high kill ratio to offset the vast numbers of Warsaw Pact tanks. Hussain, Kemp, and McCarty, 1.

<sup>44</sup> Apache armament would include a 30mm Chain Gun, up to 16 laser-guided Hellfire anti-tank missiles or 76 rockets, or a mix of both rockets and missiles. Ibid. 10.

<sup>45</sup> W. D. McGlasson (ret.), "AH-64 The Attack Helicopter of the Future," National Guard, (October 1983): 22.

<sup>46</sup> Ibid. 22.

<sup>47</sup> Ibid. 24.

<sup>48</sup> United States Army Aviation Proponent briefing presented to students of the Command and General Staff College class of 94/95, August, 1994.

<sup>49</sup> Matthew Allen, Military Helicopter Doctrines of the Major Powers, 1945-1992 (Westport, Connecticut: Greenwood press, 1993), 233.

<sup>50</sup> Office of the Chairman of the Joint Chiefs of Staff, Joint Doctrine for Military Operations Other Than War, Joint Pub 3-07 (Draft) (Washington, D.C.: U.S. Government Printing Office, 1994), I-2.

<sup>51</sup> Mark Adkin, URGENT FURY, The Battle for Grenada, (Lexington, Massachusetts: Lexington Books, 1989), 108.

<sup>52</sup> Ibid. 362.

<sup>53</sup> Ibid. 105.

<sup>54</sup> Ibid. 106.

<sup>55</sup> Joseph J. Collins, The Soviet Invasion of Afghanistan. A Study in the Use of Force in Soviet Foreign Policy, (Lexington, Massachusetts: Lexington Books, 1986), 78.

<sup>56</sup> The Amphibious Warfare School Conference Group on Afghanistan, "Battle Study," Marine Corps Gazette (July 1986): 59.

<sup>57</sup> Anthony A. Cardoza, "Soviet Aviation in Afghanistan," Proceedings (February 1987): 85.

<sup>58</sup> Tom Rogers, The Soviet Withdrawal from Afghanistan. Analysis and Chronology, (Westport, Connecticut: Greenwood Press, 1992), 4.

<sup>59</sup> Bob Woodward, The Commanders, (New York: Pocket Books, 1991), 147.

<sup>60</sup> Thomas Donnelly, Margaret Roth, and Caleb Baker, Operation JUST CAUSE, The Storming of Panama, (New York: Lexington Books, 1991), 447.

<sup>61</sup> Ibid. 13 and 391.

<sup>62</sup> Woodward, 142.

<sup>63</sup> Donnelly, Roth, and Baker, 391.

<sup>64</sup> Operations Other Than War Volume I, Humanitarian Assistance, Newsletter No. 90-6, Center for Army Lessons Learned (CALL), US Army Combined Arms Command, Ft. Leavenworth, KS, 28 December 1992, iii.

<sup>65</sup> Interview with MAJ Steve Stevens, former Operations Officer, 1st Battalion, 1st Aviation Regiment assigned to JTF Bravo.

<sup>66</sup> Ibid.

<sup>67</sup> Ibid.

<sup>68</sup> R. Lee Gore, After Action Report, Task Force Raven, (Ft. Drum, New York: 10th Mountain Division, May 1994)

<sup>69</sup> Somalia, Newsletter No. 93-1, CALL, US Army Combined Arms Command, Ft. Leavenworth, KS, January 1993, 2.

<sup>70</sup> Interview with LTC Samuel Boehm, 10th Aviation Brigade Flight Surgeon, deployed to Somalia in support of RESTORE HOPE.

<sup>71</sup> Macneil Lehrer.

<sup>72</sup> Operation UPHOLD DEMOCRACY, Initial Impressions, CALL, US Army Combined Arms Command, Ft. Leavenworth, KS, December 1994, i.

<sup>73</sup> William W. Mendel, "The Haiti Contingency," Military Review, 1, (January 1994): 52.

<sup>74</sup> Ibid. 54.

## CHAPTER 2

### LITERATURE REVIEW AND RESEARCH METHODOLOGY

#### Literature Review

The nature of this study requires research which is grouped into three major categories. These categories include historical perspective, doctrinal review, and technical base. Each category draws research from primary and secondary written sources and from personal interviews. Much of the written source material throughout all three categories is in the form of unpublished Unit After Action Reports (AAR) which provide frank insight to the subject matter. Each of the categories require further elucidation.

The historical perspective research material provides the bulk of the material for the conduct of this analysis. Primary written sources include first-hand accounts of operations written by soldiers who actually participated in the operation. These sources are from domestic as well as foreign authors (translated) providing personal perspectives on the conduct and outcome of their respective operations. Secondary sources include a plethora of periodical articles from both technical/professional journals and news magazines. The Center for Army Lessons Learned (CALL) provides a secondary source AAR for U.S. operations and training experiences. Unit AARs are a primary source for all three research categories. Finally, personal interviews with active duty and retired personnel and research organizations, such as the Center for Low Intensity Conflict provide primary and secondary source materials.

Doctrinal sources include Army and Joint publications. These sources include field manuals, publications, and a limited number of technical manuals (equipment operator manuals). As mentioned, unit AARs provide some source material for doctrinal application. It is evident that the US Army is struggling somewhat with doctrinal modification to accommodate OOTW missions. As such, publications in draft form as well as CALL documents, and Army Aviation Combat Developments documents are considered doctrinal source materials in spite of their somewhat tentative state. Army Aviation Combat Developments documents also provide source material for technical research.

Technical research source material provides the link between doctrinal base and the crux of this study. Technical research includes weapons' effects, employment techniques, and tactics. Technical research explores the effects of servicing targets in the OOTW environment. Most written material in this category is primary source material. Army technical manuals and professional journals, unit AARs, aviation combat developments data, and arsenal (Piccatinny, Redstone) data all provide written primary source material. Personal interviews also provide primary source material for the technical aspect of the research particularly in weapons employment and method of engagement.

There is some hesitance within the army aviation community to share information. There appear to be several reasons for this. First and foremost is a pervasive lack of experience in the subject. Most attack helicopter units throughout the army simply have not experienced operations in an OOTW environment. Furthermore, the specter of OOTW threatens the status quo. As such, caution in units and at the branch proponent prevails.

Doctrine for the employment of attack helicopters in OOTW should be built upon existing doctrine. The great risk here is to attempt to find the twilight zone (which does not exist) and therefore create another set of tactics and doctrine. Do not put lives and machines

at risk by trying to create another set of rules to be interpreted by pilots making split second decisions.<sup>1</sup>

Also, the perception appears to be that training for OOTW will require the dedication of scarce resources. The fear is for watering down perfectly satisfactory unit METLs and programs of instruction.

But the army aviation proponent at Fort Rucker is concerned and proactive.

[We are working on a TTP [tactics techniques and procedures] manual as a companion to FM 1-140, Helicopter Gunnery. Among the initiatives are to define what Cobra and Apache guys should be doing in low intensity combat. I will tell you there are lots of opinions, but we are leaning toward making the 20 and 30 mm cannons the weapons of choice in the LIC [low intensity conflict] environment.<sup>2</sup>

The second reason builds upon the first. Units that have had experience in an OOTW environment, such as the 10th Aviation Brigade, are hesitant to share operational details and, more importantly, their views and perceptions. The 10th Aviation Brigade, probably one of the more OOTW-experienced units has developed a comprehensive review of their operations in both Somalia and Haiti but would not release it for this study until completion of further review. This hesitancy is understandable. Future tactics, techniques, and procedures (TTP) and perhaps future doctrine will flex based upon documents such as the 10th's.

Current research and on-going analysis of the doctrinal and technical aspects of Army operations in OOTW place this study on the cutting edge of US military evolution. It is hoped that this study will assist in some small way with the development of new/modified tactics, techniques, procedures or doctrine for army aviation in OOTW. As a minimum this thesis will continue the growing interest in confronting OOTW missions. It is also hoped that this thesis will generate some

creative thought within the Aviation Community for additional study on this topic.

### Research Methodology

The purpose of this section is to outline the methods used in this study to determine whether there is a role for the attack helicopter in OOTW.

This thesis is built upon the comparative analysis method. Analysis compares the capabilities of the attack helicopter to the requirements of the OOTW environment. Analysis compares the effects of helicopter capabilities to the sensitivity and tolerance of the OOTW environment.

The answer to the research question posed in chapter 1 is found within the mind of the commander. Subjectivity reigns supreme. In spite of subjectivity, analytical methods are essential to this study.

Every National Command Authority (NCA) decision maker and commander in possession of the requisite power to authorize the deployment and subsequent employment of combat forces bases his decision, in part, upon a thorough analysis of the mission, enemy, terrain, troops, and time available. The remaining influences upon that decision stem from his experiences, knowledge, personal bias, and a plethora of other intangibles. This realization is just cause for abandonment of the definitive answer to the thesis question. This thesis does not attempt such an answer. It does, however, offer an analytically based start point for the commander as he considers terrain and troops available during his METT-T analysis of a pending OOTW mission.

Analysis compares the capabilities of the attack helicopter with requirements presented by the OOTW environment (METT-T-P). Analysis

compares the capabilities of the attack helicopter with the requirements presented by the OOTW situation (military and political). Analysis compares the employment of attack helicopters with the principles of OOTW. As is the nature of weapon system capabilities, all of this analysis is interrelated. Historical examples are interlaced throughout the analysis. They highlight the reality of the subjectivity of the decision making process and are themselves open for analysis in terms of the principles of OOTW and good common sense.

In short the analysis contained in the chapters which follow deals objectively with the capabilities of the attack helicopter by comparing them to the physical realities of the OOTW environment. Historical examples facilitate the comparative analysis by adding emphasis and by providing tangible evidence of the success or failure of attack helicopter employment.

### Endnotes

<sup>1</sup> William H. Bryan, Director, Department of Evaluation and Standards, Fort Rucker, Alabama. Colonel Bryan sent me this response via E-mail in response to my solicitation for his personal thoughts on the subject as well as any initiatives his department was undertaking reference helicopter operations in OOTW.

<sup>2</sup> John Williams, Gunnery Branch, Department of Training, Doctrine and Standards, Fort Rucker, Alabama. CPT(P) Williams sent me this response via E-mail in response to my solicitation for current doctrinal development for the employment of attack helicopter munitions in OOTW environments.

## CHAPTER 3

### ANALYSIS

In warfare, the ability to move about an area of operations is the essential prerequisite to achieving mass, ensuring security, and maintaining battlefield tempo to retain the initiative. The commander possessing the mobility advantage reaps the benefits of these other principles as well. Agility combines mobility with speed offering flexibility to respond to rapid changes in mission. Of the above sited principles only security is as essential in OOTW as it is in war. The level to which commanders require mobility and agility in OOTW is not as apparent as it is in war. This chapter addresses the OOTW requirements for mobility and agility and reviews the extent to which the attack helicopter can meet those requirements.

#### Mobility

Although the agenda of OOTW will not include battles of enemy destruction at the operational level, the wartime requirement of moving men and machines throughout the Area of Operations (AO) remains. To this extent, therefore, author Patrick O'Sullivan's quotation below applies.

Weather and terrain have more impact on battle than any other physical factor, including weapons, equipment, or supplies . . . . Indeed most battles have been won by the side that used terrain to protect itself and to reinforce fires to destroy the enemy.<sup>1</sup>

Major General Rudolph Ostovich, Commanding General of the U.S. Army Aviation Center, further underscores requirements for mobility.

The force that will carry the day on the future battlefield is the force that enjoys a commanding mobility differential. A helicopter is not stopped by minefields, rivers or refugee columns.<sup>2</sup>

In an attempt to find a function for the attack helicopter in the new world order, Stefen Geisenheyner emphasizes the profound nature of the system's mobility.

The attack helicopter is simply an extremely mobile platform for a variety of weapons. Here the emphasis should be put on the word mobility. For the first time in history, the attack helicopter offers the armed forces a mobile weapon platform which can be moved in three dimensions - regardless of natural or man-made obstacles - to any desirable location.<sup>3</sup>

Mr. Geisenheyner continues by simplifying the question of the combined attack helicopter capabilities of mobility and firepower (chapter 4 of this thesis).

When the attack helicopter is thus considered merely as a ground-independent, wheelless, all-weather gun or missile system, the whole problem is automatically seen in a different light.<sup>4</sup>

Ground independence and wheelless movement are at the crux of attack helicopter mobility. These phenomena facilitate the movement of a combat system while having no impact on the conditions of the surface. The surface does not hinder movement and the movement does not effect the surface. These results are desired in the OOTW environment as demonstrated later in this section.

It is intuitively obvious that the ability to move above the surface negates the impact upon which the surface has on that movement. Mobility is arguably the quintessential capability brought to the battlefield by the helicopter. Flight facilitates movement. Mobility is what fundamentally separates the helicopter from other vehicles. There can be little dispute that the helicopter is the most mobile combat system on the battlefield, notwithstanding arguments for the foot-soldier. The question of how much more mobility is necessary in OOTW is addressed in this section.

Mobility is a function of terrain. Required mobility is defined in terms of the manipulation of terrain to facilitate a combat system's influence in the area of operations (AO). FM 5-101, Mobility, provides further focus.

Mobility is defined as those activities that enable a force to move personnel and equipment on the battlefield without delays due to terrain or obstacles.<sup>5</sup>

The requirements for mobility, therefore, are expressed in terms of the physical conditions which dominate surface maneuver within the area of operations.

Wheeled and tracked vehicles are limited by terrain relief and surface conditions present in the area of operations. Factors of slope, hydrology, vegetation, and urban structure all influence and degrade the capability of ground vehicular mobility. FM 34-8 planning factors tabulate the mobility restrictions of ground equipment. The tables below illustrate these limitations.

TABLE 2  
EFFECTS OF SLOPE ON MOBILITY

Slope	Effect
10% (ice covered)	Delays all vehicle movement
20% (snow covered)	Delays all vehicle movement
30%	Stops most wheeled movement
45%	Delays most tracked movement
60%	Stops most tracked movement

Source: FM 5-101, Mobility, page 2-5.

TABLE 3  
EFFECTS OF WET SOILS ON MOBILITY

Vehicle Type	1 Pass Trafficability	50 Passes or more Trafficability
Wheeled	OK	No Go
Tracked (light)	OK	No Go
Tracked (heavy)	Marginal	No Go
CEV	No Go	No Go

Source: FM 5-101, Mobility, pages 3-7 and 3-8.

Concerns for mobility are directly proportional to the percentage of restrictive terrain in the AO. Severely restrictive terrain severely hinders or slows movement in combat formations unless some effort is made to enhance mobility.<sup>6</sup>

Because of its ability to fly, attack helicopters are not affected by severely restrictive terrain. But the helicopter is not entirely immune to terrain effects. The presence of severely restrictive terrain has some impact on attack helicopter movement. Slope and terrain relief aid in cover and concealment of the attack helicopter while possibly hindering its weapons' engagement ranges. Helicopters move while avoiding skylining, silhouetting, and other compromising terrain effects. Attack helicopter mobility avails the crew an infinite number of movement options from which to select the best route. The attack helicopter crew can manipulate compartmentalized terrain to provide a variety of movement and weapons-engagement options each easily assessed by the crew while in flight through hasty reconnaissance. User-friendly navigation systems onboard most attack helicopters such as Doppler and GPS (global positioning system) facilitate orientation while crews explore various avenues of approach and departure.

A ground vehicle is limited to what the surface conditions and/or slope will allow. Due to the magnitude and distribution patterns of their weight, vehicles risk damage to the surface. Movement of ground vehicles anywhere other than on improved surfaces will result in soil disturbance. The impact this disturbance may have on agrarian based towns or cultures prevalent in the OOTW environment can be catastrophic and immediately threaten the operation's legitimacy.

The helicopter does no damage to the surface. However, it can damage mature crops while hovering in ground-effect. Again, helicopter mobility permits avoidance of such a situation. In effect helicopters move while not creating damage to the plowed field, to the newly planted crop, or to the unimproved road upon which a town or village may depend.

#### OOTW Terrain

The capability to move across restrictive and severely restrictive terrain with impunity while causing no damage to that terrain is significant. The probability of encountering such terrain in an OOTW environment is also significant.

Terrain relief and surface hydrology influence the restrictiveness of terrain. Of the 24 major insurgencies since 1945, 18, or 75 percent, were on terrain with average slope greater than 6 percent. Seventeen, or 71 percent, were fought in regions where the average annual rainfall exceeded 30 inches per year.<sup>7</sup> High annual rainfall is a characteristic of the tropical/savanna regions of the world. During the 1970s, 19 of the 32 "low-intensity conflicts" (59 percent) were fought within the tropical/savanna region. During the 1980s, 22 of 35 (62 percent) conflicts occurred in this region.<sup>8</sup>

The regions with the lowest degree of economic development are predominantly in the low latitudes. Nations within this region are

either underdeveloped or intermediately developed with a few exceptions. Climatic data illustrates that this region is predominantly tropical as well as tropical Savanna. In addition to excessive precipitation, tropical climatic realms are characterized by dense foliage and moist soils.<sup>9</sup> The average annual precipitation in this region is 40 to 80 inches.<sup>10</sup>

These realms present obvious mobility difficulties to the commander. As rainfall increases within this region soils become less and less load bearing making wheeled and tracked vehicle mobility difficult or impossible. However, to a lesser extent desert is seen within this region as well.

Although desert surface conditions give the impression that they can support ground vehicular movement there are difficulties.<sup>11</sup>

Once off the road, the going is tough in deserts. Sand desert provides poor traction . . . steep erosion surfaces on valley sides confine and channel movement. The boulder-strewn slopes of arid mountains keep tanks and trucks at bay . . . .<sup>12</sup>

Finally, these realms share an additional characteristic: the world's most sparse network of roads and rail. Towns are spread out at relatively moderate distances and connected by solitary unimproved roads and/or trails.<sup>13</sup> Restricting our wheeled and tracked vehicles to the roads in these regions limits ground mobility and forces our vehicles to compete for and possibly damage these critical Host-Nation lines of communication.

The Soviet Army encountered such terrain in Afghanistan. Largely a vast expanse of extremely rugged terrain, Afghanistan's terrain ranges from desolate, rocky deserts to mountains rising higher than 25,000 feet. Most of the country is rugged, rock strewn, and over 2,000 feet above sea level. Rainfall is light; ten to fifteen inches per year. Most of the population is centered in the valleys which drain

the vast highlands.<sup>14</sup> The Soviets realized the difficulties Afghan terrain would pose on military operations.

There was a need for air and ground mobile components . . . deploying rapidly and . . . strong aviation resources for local mobility and air strikes."<sup>15</sup>

Soviet news agency--Pravda--military correspondent, Rear Admiral Timur Arkadyevich Gaydar reported that Mi-24 Hind gunships satisfied that need by offering mobility and firepower.<sup>16</sup>

Although terrain relief was vastly different in Vietnam, the similarities between the Soviet experience in Afghanistan and the U.S. experience in Vietnam in terms of requirements for mobility are striking. In Vietnam, "it was soon realized that air mobility was the only answer to the guerrilla tactics of the Viet Cong."<sup>17</sup> The conditions in Vietnam and in Afghanistan were excellent for conducting guerrilla warfare. In Vietnam dense jungle and wet soils severely restricted vehicular movement. The US Army redefined force structure around the helicopter and fielded an entirely new Air Mobile concept manifest in the Air Mobile Division. In Afghanistan narrow and winding roads which cut through steep valleys did not permit effective employment of the Soviet's heavy mechanized forces. The Soviets became so dependent upon aviation for tactical maneuvering that 80 percent of all Soviet operations in Afghanistan were supported by aviation.<sup>18</sup>

Although its mountainous terrain did not influence operations during Operation UPHOLD DEMOCRACY, Haiti's terrain is also typical of the OOTW environment.

Haiti, an Indian word meaning "mountains," is made up of extremely mountainous country of which only 20 percent of the territory lies below 600 feet.<sup>19</sup>

During this operation, however, the mobility of the helicopter enabled the Haiti Task Force (TF) to initially stage helicopters from the deck

of the USS "Theodore Roosevelt" safely positioned offshore, a technique used routinely by the U.S. Marine attack helicopter crews.<sup>20</sup>

#### Military Operations on Urban Terrain (MOUT)

Urban terrain is generally classified as severely restrictive terrain. FM 5-101 states the obvious reason: "Mounted forces are restricted to streets, alleys, and open areas between buildings."<sup>21</sup> While operating in urban terrain, the ground maneuver force is limited to specific avenues of approach, weapons employment and target acquisition, communication, and synchronization. Past OOTW operations are replete with activities in MOUT. During Operation RESTORE HOPE, "[w]ell over 90% of the targets identified by the Joint Task Force in Somalia fell within the city limits of Mogadishu."<sup>22</sup> This operation was the longest sustained MOUT operation in which attack helicopters participated.<sup>23</sup>

Helicopter mobility advantages are apparent in OOTW. As in other restrictive terrain, helicopters can overfly restrictive urban terrain. Structure patterns and building dimensions influence attack helicopter movement with similar effects as natural terrain. Attack helicopters are not restricted to alleys and roads. The attack helicopter maintains many options to use MOUT to mask, cover, and conceal movement. Attack helicopter weapons employment and target acquisition in MOUT is discussed in chapter four.

As urban terrain restricts movement, it also limits communications. "Urban features . . . increase the difficulty of maintaining effective communications."<sup>24</sup> The attack helicopter, as a visionics platform, may assist the ground commander in relaying communications and conducting videotape recorded reconnaissance (non-lethal firepower, Chapter 4). Its vertical mobility allows line of

site frequency modulation (FM) communications in electromagnetic-restricting urban environments.

As stated in the Army's mobility field manual, operations conducted in urban terrain during open warfare are stressful.

Continuous close combat, high casualties, the fleeting nature of targets, and fires from a frequently unseen enemy produce severe psychological strain and physical fatigue particularly among small-unit leaders and soldiers.<sup>25</sup>

The level of stress increases significantly in an OOTW urban environment where the enemy and civilian population are difficult to discern. The ability to protect his force becomes a primary concern for the commander. By integrating the attack helicopter into the scheme of maneuver, and by maintaining ground to air communications, the commander vastly increases his level of force protection.

Urban terrain lends itself to being very easily defended by a relatively small force. In OOTW, urban terrain avails small groups or individuals a multitude of firing positions. To defeat this threat FM 90-10 suggests attacking the enemy's flanks and rear and concentrating overwhelming combat power to disrupt and envelop the enemy through rapid movement. The mobility of the attack helicopter coupled with its characteristic speed makes flanking movement in MOUT feasible and relatively easy. The ability to concentrate is likewise made easy through rapid and unrestricted mobility.

The principle concern in a MOUT environment, such as that of Mogadishu, was the infinite possibilities for cover and concealment afforded the enemy. Friendly forces while enroute to specific objectives quite literally could walk right up to a concealed enemy with disastrous results. When the mission was to destroy a specific enclave or building nested within the urban area, great risk to individual soldier's lives was avoided through the use of attack helicopters which

could avoid negotiating the terrain on the ground and proceed directly to the target.<sup>26</sup>

The Abdi (Aideed subordinate-warlord) House raid exemplified the utility of attack helicopters in MOUT. Attack helicopters prepared the assault objective (Abdi house) with 20mm and TOW missile fires. Attack helicopters destroyed the house/compound which was located within the urban terrain of Mogadishu. Minimal destruction occurred beyond the confines of the compound.<sup>27</sup>

Although discussed in great detail in Chapter 4 of this study, firepower is directly linked to mobility and requires some attention at this time. Channelization of ground vehicular movement delays and possibly prevents the ability to employ vehicle based weapons. The foot soldier is well suited to engage targets within urban terrain. But the risk and time required for this option may be prohibitive especially when the threat is of some strength, or armed with medium and/or heavy weapons. The attack helicopter, employing its mobility advantages, can position itself from a variety of locations to maximize its lethal and accurate weapons effects. Depending upon the urban layout, the attack helicopter may be able to employ its weapons beyond the range of threat systems (standoff), greatly reducing the risk to the crew.

#### Concerns for MOUT

Readiness may stand in the way of effective attack helicopter employment in urban terrain. Much concern has come from CALL observations in reference to the level of proficiency of aviation forces in conducting operations in urban terrain. Meanwhile, the Army Aviation branch proponent position remains that attack helicopters are not well suited for MOUT. CALL disagrees.

Operation UPHOLD DEMOCRACY once again demonstrated that aviation forces must be able to operate in an urban environment as in Panama

City, Mogadishu, and Port-au-Prince. These are all recent operations that have proven the usefulness and effectiveness of rotary wing aviation forces in the city."<sup>28</sup>

According to CALL research, "the ability of aviation assets to be utilized in an urban area, especially against non-sophisticated ADA systems has been proven."<sup>29</sup> Currently some doubt exists in the ability of attack helicopter crews to ply their trade in MOUT.

There are unique man-made obstacles that effect the flight of the attack helicopter as well as the performance of some of its munitions. Wires are the helicopter's bane. Antennae and clothes lines can also be catastrophic.

Several task force aircraft aborted missions because of kite string wrapped around tail rotors. The Somalis also used slingshots as an air defense weapon. Although the odds of bringing down a helicopter with a sling shot are not great, it has happened to the British Army in Northern Ireland.<sup>30</sup>

Attack helicopter mobility also comes with its inherent vulnerability. Flight profiles for any aircraft are a culmination of delicately balanced aerodynamic forces which, if upset, can have a catastrophic effect. General Downing, Commander in Chief, US Army Special Operations Command, made this point during his 23 April address at the 1994 Army Aviation Association of America (AAAA) annual convention.

The fight in Mogadishu on 3 October is a good example. We used the best trained aviators and the best helicopters in the world in what was probably the lowest tech area of the world. Yet with a simple weapon--the RPG-7--clan fighting criminals shot down two Black Hawks, and severely damaged two others.<sup>31</sup>

The commander's METT-T-P analysis must identify threat capabilities in light of friendly vulnerabilities.

### Strategic Mobility

In his study, Terrain and Tactics, Patrick O'Sullivan argues, "the further the force is extended, the weaker it becomes."<sup>32</sup> Indeed this concern and the fact that most future conflict will be fought at some distance from the Continental United States (CONUS) has fueled the development of current US force projection doctrine. Such a doctrine is clearly dependent upon strategic mobility. The means of strategic mobility (airlift or sealift) complicate the equation of employing the military instrument of power to find an OOTW solution. Equipment size and weight limit strategic lift. Table 4 below compares airlift capacity of strategic air assets in terms of army combat systems.

TABLE 4

STRATEGIC AIRLIFT

Lifter	AH-1	AH-64	M1	M2/3
C5	8	6	1	3
C141	4	2	0	0

Tracked vehicles of comparable firepower to the attack helicopter are virtually immobile in rapid strategic air assets. In one lift a C5 or C141 can deploy a contingent of attack helicopters. One C5 could have deployed all the AH-1s sea-lifted to Somalia. The attack helicopter, however, possesses the capability of self-deployment. Self-deployment allows the commander the ability to use the mobility of a single combat system strategically. With extended-range fuel tanks, the AH-64 can fly over 1,000 nautical miles into a ten-knot headwind.<sup>33</sup> This strategic mobility capability allows its deployment into most regions of the world without the requirement for strategic lift. Attack helicopters, therefore, avoid air and sea ports of departure (POD) and

the multitude of concerns associated with them. Some firepower degradation is required, however, as fuel pods occupy wing store positions otherwise accommodating rocket or missile pods.

Strategic self deployment does not occur without some additional cost manifest in attack helicopter readiness upon arrival in theater. Some degradation with associated additional maintenance requirements must be expected as the attack helicopters experience wear and tear while enroute.

#### Summary

The case for moving throughout the AO above the effects of terrain and surface conditions is obvious. One may conclude that terrain analysis of the potential OOTW regions is a good argument for the use of the helicopter in general and not necessarily the attack helicopter. This argument is sound and valid. But the inherent helicopter capability of mobility demonstrated by the attack helicopter is further elucidated by its other capabilities. Mobility is the capability upon which all other attack helicopter capabilities depend and exploit.

Lieutenant Colonel (Retired) John B. Hunt with the U.S. Command and General Staff College recently wrote of the perception of resolve demonstrated by military movement.

Military units of the peace enforcement commands must demonstrate their determination to have freedom of movement in the affected area. Their movements should be as open as the security situation permits. Aerial patrols should be conducted frequently.<sup>34</sup>

The attack helicopter flying with impunity adds to the credibility of this determination.

According to CALL, and based on observed helicopter performance in past operations, Army aircraft may be the system of choice in urban

terrain. The current state of doctrine is lacking in support of this notion. CALL advocates,

[the] use of Army aircraft within MOUT during OOTW has been demonstrated in Panama, Somalia, and Haiti. Appropriate doctrine should be developed and incorporated into Aviation Field Manuals.<sup>35</sup>

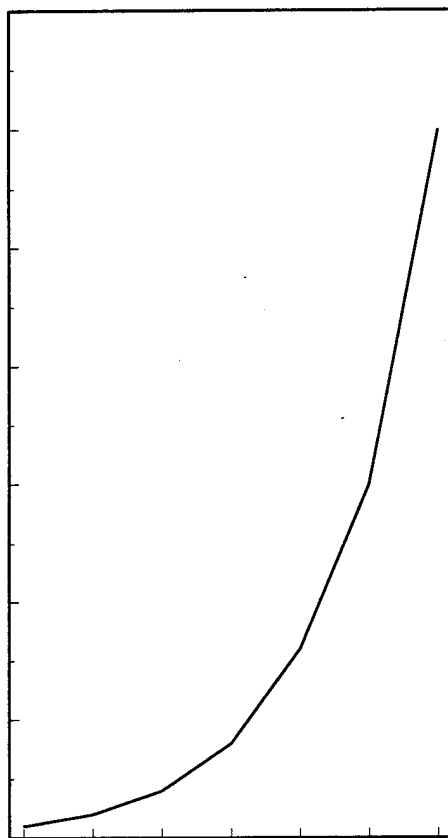
The effectiveness of helicopters in urban terrain is clear. Proponents should develop doctrine, tactics, techniques, and procedures to provide a standardized base for employment of helicopters in urban terrain.

### Agility

Agility combines mobility and speed to react or to counter-act to changes presented by threats within the OOTW environment. Likewise, the agility of the attack helicopter is defined in terms of the ability of its crew to rapidly change their mission and respond to unexpected threats.

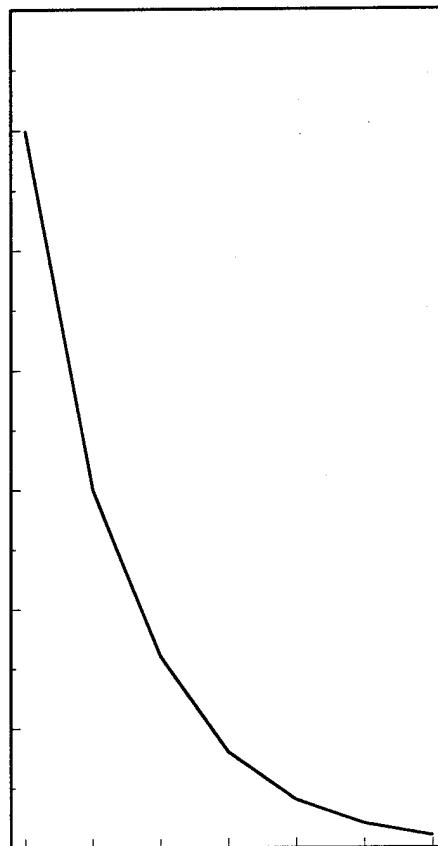
Principal factors of the OOTW environment include but are not limited to the structure, nature, and psyche of the threat. These factors present the greatest risk to the commander in OOTW and determine the degree of consistency and predictability of the threat. One can expect unpredictability from the "enemy" in OOTW. Forces operating in OOTW can also expect multiple threats acting independently (with neither unity of effort nor unity of command) and presenting a multitude of varied and disconnected threat courses of action (COA) with which to contend. Similarly, a unified, well armed and dispersed threat creates a fluid and uncertain enemy situation. In either instance the commander's need for agility in applying force is inversely proportional to the level of enemy predictability. Figure 1 aids in illustrating the relationship of the requirement for agility and the unity and/or dispersion of the enemy.

Increasing Enemy Dispersion



Required Agility ----->

Increasing Enemy Unity



Required Agility ----->

Figure 1. Agility

Rational and predictable threats are convenient in terms of METT-T analysis. They allow us to develop courses of action (COA) to influence enemy weaknesses. They allow us to position forces to carry out these COAs. We cannot depend on rational actors in OOTW as indicated by CPT John Hillen in his January, 1995 Army article: "Today's nonstate actors, fueled by irrational religious and ethnic tensions, do not always care to recognize rational signals."<sup>36</sup> A thorough and sweeping Political analysis (METT-T-Political) may provide the only semblance of predictability. Nonetheless, OOTW enemies are unpredictable by conventional standards. The need for agility if only to react to fluid irrational resistance and/or fighting is evident.

Requirements for agility are based on the nature of the threat and his response. Many of the threats posed by the OOTW environment will not be other nations. They will be drug cartels, crime syndicates, ideological revolutionaries, religious radicals and other borderless, transnational groups with different and varying agenda. During his address at the 1994 AAAA convention, General Downing highlighted the growing concern of vague OOTW enemies.

These enemies may not have an identifiable center of gravity as we define it; they may not have an army, and almost certainly do not have the kind of infrastructure that our precision weapons and stylized tactics are ideally suited for.<sup>37</sup>

The agility of Army aviation assets may provide part of the solution as indicated below by General Downing.

[A]viation can provide the mobility required to take advantage of the perishable intelligence we need to defeat small, covert targets hiding among the population and which can move quickly at the first sign of trouble.<sup>38</sup>

Speed is required to 'take advantage of perishable intelligence.'  
Attack helicopter agility provides the enabling speed to make effective use of such intelligence.

During Operation RESTORE HOPE in Somalia the enemy situation was fluid. Factional fighting between rival clans and against aid efforts dominated the entire operation. Factions were widely dispersed in terms of purpose and location. The volume of hostility in the beleaguered nation was overwhelming. In his recent article published in Military Review, Jonathan Dworkan best summarizes the anarchy in Somalia.

"[S]omali factions, and most of the population, were well armed. Guns were an ever-present aspect of Somali life, and carrying them in the open was very common before UN intervention."<sup>39</sup> After UN intervention the situation did not improve as roving gangs of unemployed young males turned to thievery. Mr. Dworkan reported, "Most military and relief vehicles that stopped in towns due to traffic faced swarms of children trying to steal anything they could."<sup>40</sup> The large number of relief vehicles conducting separate and widely dispersed missions and requiring protection demanded military forces of great agility. Flexible combat power would have to meet the requirements for Non-governmental Organization (NGO) and force protection from the Somali mob. Hostilities could flare up anywhere there was an on-going UN, NGO, or military activity.

The Somali OOTW environment provided ample opportunity for the supporting AH-1F helicopters present to test their agility. On 27 June, while conducting armed reconnaissance of a previous day's ambush site, attack helicopter crews were notified that a Pakistani patrol operating within Mogadishu had come under Somali attack. The AH-1s were diverted from their ongoing mission and responded to support the Pakistanis within minutes. A ground response would have required careful negotiation of the congested and hostile streets of Mogadishu greatly increasing response time and endangering reaction forces to ambushes while enroute.<sup>41</sup>

Not surprisingly, RESTORE HOPE/UNOSOM II leaders included attack helicopter assets as part of the QRF (quick reaction force). This force was the primary maneuver force to protect the United Nations operations in theater. As expected by the QRF, mission change was a daily occurrence. New missions were based on intelligence which was usually low in certainty, vague or ambiguous further increasing the requirements for flexibility. As such, in Somalia Cobra crews and their team mates had to be more reactive than proactive. The command expected a high level of agility from its QRF and the Cobras for their part seemed to be able to comply.<sup>42</sup>

Mission creep in Somalia changed the mission of the operation at the strategic level. Protection of humanitarian relief efforts evolved into attacks and raids aimed at facilitating nation-building. The attack helicopter's role changed from providing reconnaissance and a show of force, to providing security, and then to conducting attacks. The command seemed able to flex to changing or creeping missions while continually employing its attack helicopters.

Engaging targets while conducting raids required a measure of agility in itself. Attack helicopter crews engaged a wide variety of targets. While attack helicopter crews were destroying artillery and armored targets parked within warlord compounds, other crews were cutting wire cable bundles and destroying generators within specific buildings in Mogadishu.<sup>43</sup>

Captain Charles Ferry, Infantry Company Executive Officer in Somalia had the opportunity to conduct tactical operations with attack helicopters. For his company, attack helicopter agility manifest in responsiveness was essential. "Best of all, helicopters have a fast response time, and the pilots who fired for us were always eager to help."<sup>44</sup>

The Army CALL team which accompanied Operation UPHOLD DEMOCRACY forces in Haiti studied the large contingent of Army helicopters which accompanied the Joint Task Force. Speed and rapid response time were the desired effects which warranted inclusion of attack helicopters in the JTF troop list.

The aircraft is a key system because of its ability to rapidly respond from one location to another, especially where ground routes may be blocked.<sup>45</sup>

#### Summary

Agility is a valuable force capability when confronting fickle OOTW threats. Even the best developed and rehearsed plan can be invalidated by the actions of an irrational and unpredictable enemy. The helicopter's physical capabilities of speed and maneuverability provide a substantial system capability of agility which satisfies, at least in part, the commander's needs to respond to OOTW threats.

## Endnotes

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<sup>3</sup> Stefan Geisenheyner, "In search of a tactical concept: The Attack Helicopter," Asian Defense Journal (October 1983): 32.

<sup>4</sup> Ibid. 32.

<sup>5</sup> U.S. Army, FM 5-101, Mobility, (Washington, D.C.: Headquarters, Department of the Army, 23 January 1985), i.

<sup>6</sup> U.S. Army, FM 34-130, Intelligence Preparation of the Battlefield, (Washington, D.C.: Headquarters, Department of the Army, 8 July 1994), Glossary-9.

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<sup>9</sup> Military Aspects of World Political Geography (Air University: Maxwell Air Force Base, AL.: 1959), 52 and 70.

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<sup>12</sup> Ibid. 24.

<sup>13</sup> Ibid. 24.

<sup>14</sup> Ibid. 15-16.

<sup>15</sup> Graham H. Turbiville, "Counterinsurgency and Soviet Force Structure," Infantry (November/December 1991): 20-26.

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<sup>19</sup> Haiti, Newsletter No. 94-3, Center for Army Lessons Learned (CALL), US Army Combined Arms Command, Ft. Leavenworth, KS, Jul 94, I-1.

<sup>20</sup> "Helos afloat, Army pilots learn the ups and downs of carrier-based flying," Army Times, 19 September, 1994, p. 45. Interview with LTC William Driver, Commander, 2-25 Attack Helicopter Battalion.

<sup>21</sup> FM 5-101, 1-11.

<sup>22</sup> U.S. Army Operations in Support of UNOSOM II (final draft), Center for Army Lessons Learned (CALL), US Army Combined Arms Command, Ft. Leavenworth, KS, October 1994, p. I-6-2.

<sup>23</sup> Ibid. I-5-1.

<sup>24</sup> FM 5-101, 1-11.

<sup>25</sup> FM 5-101, 1-11.

<sup>26</sup> Michael Gawkins, Lessons Learned From Somalia, C/2-25 ATKHB, 22 April 1993 - 30 August 1993, Ft. Drum, New York: 10th Mountain Division, 1993.

<sup>27</sup> Ibid.

<sup>28</sup> Operation UPHOLD DEMOCRACY Initial Impressions, Ft. Leavenworth, Kansas: Center for Army Lessons Learned (CALL), December 1994, 162.

<sup>29</sup> Ibid. 172.

<sup>30</sup> CALL, UNOSOM II, I-5-7.

<sup>31</sup> General Wayne A. Downing, "Army Aviation and the Changing Threat" Army Aviation (31 July 1994): 9.

<sup>32</sup> O'Sullivan, 49.

<sup>33</sup> Norman B. Hirsh, "AH-64, A Total System for Battle," U.S. Army Aviation Digest (July 1986): 9.

<sup>34</sup> John B. Hunt, "Thoughts on Peace Support Operations," Military Review 10 (October 1994): 81.

<sup>35</sup> CALL, UPHOLD DEMOCRACY, 173.

<sup>36</sup> CPT John F. Hillen III, "The Backlash of Limited War," Army (January 1995): 7.

<sup>37</sup> General Wayne A. Downing, "Army Aviation and the Changing Threat" Army Aviation (31 July 1994): 8.

<sup>38</sup> Ibid. 10.

<sup>39</sup> Jonathan T. Dworken, "Rules of Engagement, Lessons from RESTORE HOPE," Military Review (September 1994): 27.

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<sup>41</sup> Brett Johnson, After Action Review, TF Mountain Warrior. Ft Drum, New York, 30 September 1993.

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<sup>42</sup> Jeffrey Fraher, Phonecon interview with CW2 Fraher while he was at Fort Rucker after returning from Somalia with the 10th Mountain Division. CW2 Fraher was a scout pilot for Task Force Raven as part of the 10th Mountain Quick Reaction Force (QRF). He served two tours in Somalia for 3 then 5 months. He was an Air Mission Commander for Night

Vision Goggle (NVG) flights in Somalia. His team was normally one scout and one cobra helicopter.

<sup>43</sup> Michael Gawkins, Lessons Learned From Somalia, C/2-25 ATKHB, 22 April 1993 - 30 August 1993, Ft. Drum, New York: 10th Mountain Division, 1993.

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<sup>45</sup> CALL, UPHOLD DEMOCRACY, 164.

## CHAPTER 4

### ANALYSIS

#### Firepower

"As a result it was often very frustrating to successfully accomplish a mission with all the limitations placed on the attack company due to collateral damage."<sup>1</sup> This quotation from a company level commander in Somalia addresses the essence of the problem of overwhelming firepower in an OOTW environment. It is the remedy of solving the collateral damage limitation problem which ultimately gives credence to the use of the attack helicopter in OOTW.

The OOTW principles of restraint and legitimacy are threatened by the use of attack helicopter firepower. As discussed in a later section of this paper, the mere consideration of employing the attack helicopter to an OOTW theater is enough to question a nation's legitimacy and earnest restraint. The perception of "Americanization" in solving an OOTW issue gains momentum as the amount of American firepower present (as part of the solution) increases. But when that firepower is not available, force protection is threatened. Can the employment of the attack helicopter allow the commander to strike a balance between these competing fundamentals?

In Haiti, soldier expectations changed initially from great apprehension for an expected opposed landing, to being instructed to cooperate with Haiti's police, and then to control those police. After the unopposed invasion, "[t]he happy scene of welcome quickly turned ugly. Club swinging Haitian police waded into the crowd." The ensuing

brutality outraged the U.S. public watching on the News. "Public outrage in the United States changed the rules of engagement within 24 hours." ROE parameters would change three times within the opening hours of the operation.<sup>2</sup> Fickle ROE and significant lethal firepower are a risky combination for the commander. Had attack helicopters been employed in accordance with old ROE (rescinded with greater restrictions) Haitian support may have been severely jeopardized. Conversely, had attack helicopters been restricted by old ROE (rescinded with fewer restrictions) soldiers may have been ineffectively supported.

Firepower restraint is routinely at odds with force protection and mission accomplishment. Some of the fiercest fighting between UN troops and Somali gunmen raged around hospitals where lack of restraint can be disastrous, and where lack of response endangers friendly troops. Frustration reigns supreme. After helicopters fired on women and children who happened to be close to an ambush of Pakistani soldiers (where Aideed's men destroyed a tank), the American military spokesman for the UN commented:

There are no spectators at an ambush. Women and children in the area are considered a threat. They are considered combatants, whether they shoulder arms or not.<sup>3</sup>

A controversial view indeed.

The importance of establishing clear ROE can not be overstated. The ROE is a direct product of METT-T-P analysis. Commanders walk a narrow path in deciding upon the best ROE. In general, employing attack helicopters may risk violation of OOTW principles; while overly restricting employment may endanger soldiers lives.

Concerns for collateral damage are not new and are certainly not unique to OOTW. U.S. doctrine has addressed the issue as it pertains to military operations in urban terrain (MOUT) regardless of the intensity of the conflict.

Constraints on firepower to insure minimum collateral damage within . . . built-up areas can be expected. Success may well be measured by how we accomplish our mission while minimizing destruction of buildings and alienation of the population.<sup>4</sup>

The applicability of the attack helicopter in MOUT then becomes part of the problem. In OOTW, MOUT may be prevalent. Operations URGENT FURY, JUST CAUSE and RESTORE HOPE all included MOUT as part of the overall operation. Chief Warrant Officer Jeffrey Harris described difficulties he had as an attack helicopter pilot during Operation JUST CAUSE.

It was pretty difficult to locate the targets because it was a populated area . . . the enemy snipers would duck back in the crowd as soon as they fired their shots, making retaliation impossible.<sup>5</sup>

To properly address these questions one must understand the nature of the attack helicopter as a combat system and the munitions it employs. This chapter describes munitions and effects in the framework of OOTW concerns. Throughout are historical examples which both support and discourage attack helicopter use.

Currently there are nine helicopters in the world's inventory which are true attack helicopters as defined in chapter one. Each have rocket, cannon and/or missile firing capability. Their primary role is that of a weapons platform. They are tabulated in table 5 below. Although this study will refer to all of these aircraft the majority of this study focuses on US attack helicopters. Since most attack helicopters are similarly equipped this study in effect applies to all attack helicopters in general notwithstanding differences between tactics, techniques and procedures employed by armies in accordance with their respective doctrines. Table 5 enumerates weapon systems found aboard the world's attack helicopters.

TABLE 5  
ATTACK HELICOPTERS WORLDWIDE

<u>Aircraft</u>	<u>Cannon</u>	<u>Rocket</u>	<u>Missile</u>	<u>Range (km)</u>	<u>Crew</u>	<u>Speed (km/hr)</u>
AH-64 McDonnell Douglas	30mm	2.75in	Hellfire	482 1701 ext	2	293
AH-1 Bell	20mm	2.75in	TOW2 Hellfire	507-587	2	227-278
PAH-2 Euro	30mm	68mm	HOT2	700	2	250-280
A-129 Agusta	vary wing pod	70/81mm	TOW HOT2 Hellfire	540	2	259
Mi-24 MIL	vary turret wing pod	57/80mm	AT-2	500 1000 ext	2	270
KA-50 Kamov	30mm	80mm	Laser Guided No Data	~500	1	~320
Mi-28 MIL	30mm	57/80mm	AT-6	470	2	270
Lynx-3 Westland	20mm	None	HOT TOW Hellfire	620	2	278
AS 550 Euro	20mm wing pod	68mm	TOW	666	2	246

Source: Jane's All The World's Aircraft, 1992-1993.

Note: South Africa's operational experience, including combat in Angola, led to the development of its Atlas CSH-2 (Rooivalk). Still in its final stages of development, the Rooivalk is an attack helicopter equipped with rocket pods, anti-tank missiles, and a chin mounted 20mm canon.<sup>6</sup>

#### Attack Helicopter Munitions

As previously discussed, the firepower capabilities of the attack helicopter are significant.

Consider the firepower of the AH-1S Cobra or AH-64 Apache whereby 6 or more helicopters (up to 21) can fire 38 to 76 rockets each.

This potent concentration of indirect fire more than equals that of an entire division artillery.<sup>7</sup>

The need for firepower is primarily a function of the nature of the threat. Although certainly a function of the threat's capabilities, firepower requirements in OOTW are also a function of the environment in which the threat is operating, the political ends considered in mission analysis (METT-T-P), and the collateral damage tolerance level allowed to achieve the mission. In OOTW concerns for restraint and legitimacy give primacy to the limitation of collateral damage. The need for firepower in terms of attack helicopter weapons and munitions in essence becomes a function of how well those munitions can service the target without creating collateral damage within the target periphery. As such, weapon accuracy/dispersion and terminal ballistic effects (blast, burst and incendiary) become the barometers for the measurement of firepower effectiveness in OOTW.

If several projectiles are fired from the same weapon with the same settings in elevation and deflection, their points of impact will be scattered about the mean point of impact of the group of rounds. The degree of scatter in terms of range and deflection is called dispersion. The mean point of impact with respect to the target center defines the weapon's accuracy. Both dispersion and accuracy determine whether a particular weapon can hit an intended target. Some weapons such as FFARs capitalize on wide dispersion. Dispersion and accuracy are influenced by errors inherent in firing projectiles as well as vibrations in the gun mount and the condition of the gunsights.<sup>8</sup>

Figure 2 aids in illustrating how OOTW tempers the requirement for firepower. The horizontal tolerance level curve is a subjective and cognitive "mark on the wall" determined by METT-T-P analysis. The curves for dispersion, accuracy and blast/burst (terminal ballistics) are independent of each other and somewhat intuitive. Each curve

represents the comparison of an increase in the effects of its respective weapon/munition characteristic to the potential for producing collateral damage. For example, as weapon accuracy increases the potential for collateral damage decreases. Figure 2 simply illustrates the following: for the commander to avoid jeopardizing legitimacy and violating restraint he must employ weapons and/or munitions to the extent that the effects of that employment remain within what he has determined to be the collateral damage tolerance level.

Cannon, rocket, and missile systems employ munitions which are more generally grouped into one of two types; area-target or point-target munitions. There is some debate as to the terminology of target-type munitions but generally point-target munitions are of high precision and capable of consistently high accuracy. Area-target munitions are of less accuracy and/or greater dispersion either by design or by errors introduced in the application of the weapon system and manifest in round trajectory. The attack helicopter missile system is a point-target weapon while the rocket and cannon systems are area target weapons.

Terminal ballistics describes the characteristics and effects of the projectiles at the target or in the target area. Projectile functioning (dud versus effect) to include blast, heat and fragmentation and is influenced by fuse type, warhead type, surface conditions and angle of impact.<sup>9</sup>

#### Point Target Weapons

"Many . . . threats we will face will put a premium on the extremely precise application of power to elusive and often almost indiscernible targets."<sup>10</sup> This quotation attributed to General Downing,

Increasing Collateral Damage Potential

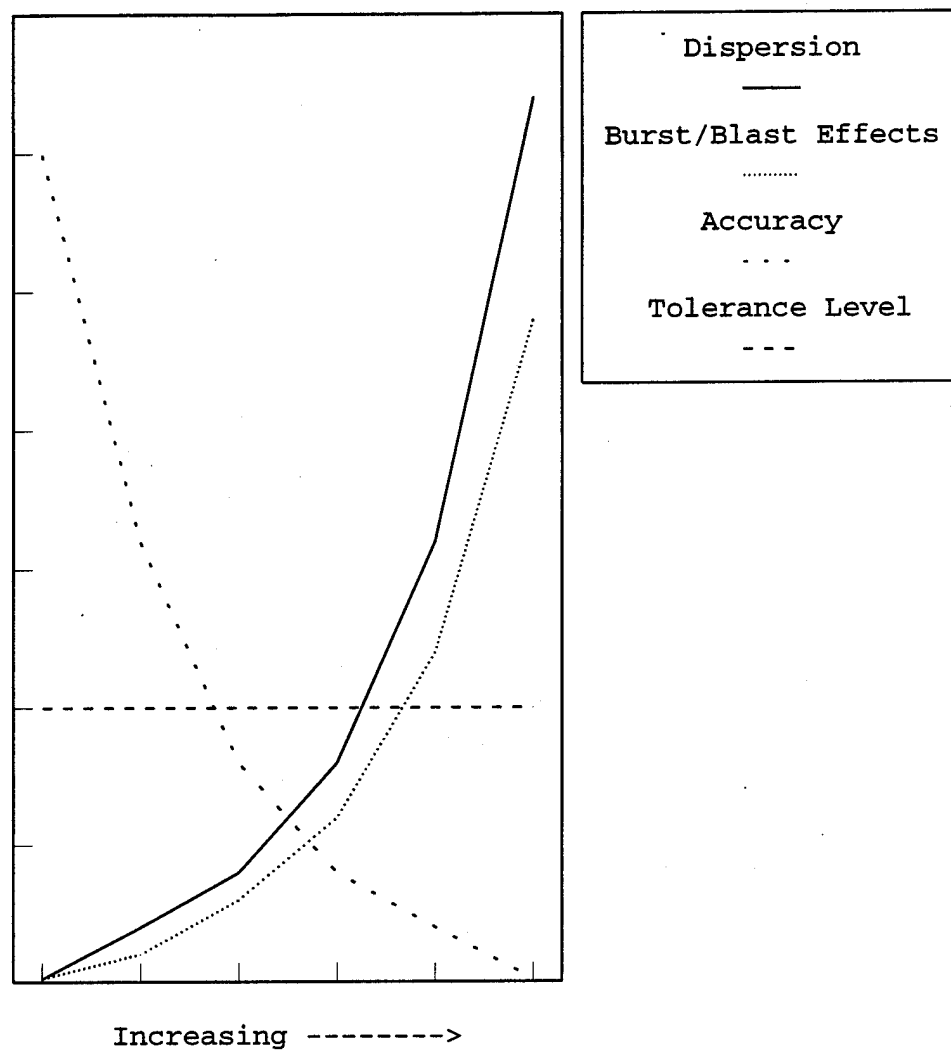


Figure 2. Firepower Relationships

United States Army Special Operations Command (USASOC) Commander gives added emphasis to the need for guided munitions.

LTC (Ret) Hunt suggests JTFs can accomplish an effective show of force through the use of point target weapons. "Selective use of precision weapons against symbolic targets may deter a belligerent before stronger action becomes necessary."<sup>11</sup> The precision munitions brought to the OOTW environment by the attack helicopter may accomplish this method of deterrence.

All ATGMs are point target munitions. They employ precision guidance systems to hit 3m x 3m targets at ranges in excess of three kilometers. The TOW missile is guided by direct wire link to the gunner's sight enabling the missile to make small course corrections in flight to stay exactly on target. The wire guidance system becomes severely impeded if wires snag in trees or other obstacles, or fall across other wires.<sup>12</sup> The missile then becomes erratic and control is lost. Employment technique thus becomes essential in avoiding collateral damage with delicately guided munitions.

The current generation ATGM is the Hellfire. Like the TOW the Hellfire is a point-target munition. Its range is significantly greater than the TOW's. Although developed for the Apache, the Hellfire can be employed from certain AH-1 variants as well. Hellfire is guided by a passive laser seeker in the nose of the missile. The gunner designates the target by lazering and then launches the missile. The Hellfire can be a fire-and-forget missile for the firing crew if another aircraft or ground/vehicle laser locator designator (GVLLD) designates the target. The Hellfire can lock onto target either before or after launch. In the latter situation (requiring remote designation) the missile is fired indirectly allowing the launching helicopter to remain masked from enemy

observation or fires.<sup>13</sup> Hellfire guidance is not as vulnerable as wire guided systems and therefore may be better suited for MOUT.

The next generation ATGM is the radar-frequency (RF) Hellfire and is the centerpiece of the Longbow Hellfire Modular Missile System (LBHMMS) currently undergoing test and evaluation with the AH64D Longbow Apache. The RF Hellfire is a true fire and forget point-target weapons system providing its own guidance to the target area.

The missile flies an end-around trajectory to take advantage of doppler-beam sharpening of stationary and moving targets.<sup>14</sup>

The AH-64 crew can also fire Hellfire missiles by locking onto target before launching the missile (lock-on before launch--LOBL) or by designating the target after launching the missile (lock-on after launch--LOAL). By locking onto the target after launching the missile the crew avoids prolonged target "painting" and aircraft exposure.

Of 1800 autonomous engagements where the standard was target hit (target size 3m x 3m) the hellfire hit 89% of targets at 2000m, 83% of targets at 3700m, and 87% of targets at 4500m for an overall total of 86% target hits.<sup>15,16</sup> These actual performance figures are somewhat lower than the missile's theoretical probability of hit which is excess of 90% and are attributed to deficiencies in gunnery proficiency. While deciding to employ the hellfire, the commander must determine whether the ensuing collateral damage of 10%-13% probability of miss falls above or below the tolerance level curve, or effect adjustment in method of engagement to minimize or eliminate the effects of errant missiles.

#### Area Target Weapons

The 2.75 inch folding fin aerial rocket (FFAR) is a light antipersonnel/antimateriel assault weapon. Improved MK66 flight motors provide increased range and reduced dispersion. There is a broad range

of warhead/fuze combinations available to allow selective effects against a variety of targets.<sup>17</sup>

Rocket fuse types provide the commander options for firepower effects in varying OOTW environments. Impact fuses achieve surface and subsurface bursts of the warhead. Impact fuses are either super-quick for detonation upon impact, penetration for detonation after penetration of foliage, or delay for detonation after penetration of other types of overhead cover.<sup>18</sup> Proximity or variable fuses are timed fuses which produce air bursts and are most effective against targets with no overhead cover. Wall-in-Space fuses provide a large increase in target effect and virtually eliminates range-to-target errors caused by variations in launcher/helicopter pitch angles during launch.<sup>19</sup>

There are several types of FFAR warheads. High explosive (HE) is an anti-personnel, anti-materiel warhead and is configured with an 8.7 or 16.4 pound warhead. The bursting radius is 10 meters; however, high velocity fragments can produce a lethality radius in excess of 50 meters. Illumination warheads are designed to provide one million candlepower for 100 seconds or more. White phosphorous (smoke) warheads are designed for target marking and incendiary purposes. The smoke warhead also is configured to produce smoke screens. The flechette warhead is used primarily for antipersonnel operations and contains 1180 or 2200 hardened steel flechettes depending upon the configuration. This warhead is used with a delay type airburst fuse.<sup>20</sup>

Both the AH-1 and the AH-64 can carry up to 76 2.75in Folding Fin Aerial Rockets (FFAR). Small changes in aircraft pitch attitude drastically effect rocket range accuracy and increase undesired additional dispersion. However, significant improvements have been made in improving rocket ranging accuracy. The M73 (wall in space) rocket fuse combined with the multipurpose submunition (MPSM) warhead receives

range data from the laser range finder through the fire control system. Once fired, rockets eject 9 submunitions (SM) at a specified range regardless of initial rocket pod angle of elevation. The expelled SMs each deploy a ram air decelerator and descend vertically to the target area. Pitch errors prior to launch have no impact on ranging accuracy.<sup>21</sup> The MPSM HE warhead SM dispersion is reduced at longer ranges as munitions have less momentum and descend more vertically. An SM which lands five degrees off vertical center has a 90% chance of producing casualties within a 20-meter radius.<sup>22</sup> As the angle of impact increases so does the likelihood of an unexploded round (dud). Some degree of lateral rocket dispersion remains a desired effect placing the rocket effects higher on the dispersion effects curve.

Hydra 70 rockets are inherently inaccurate in terms of hitting a point target. Excluding the instability of a hovering attack helicopter FFARs exhibit considerable dispersion. When launched from a rigid, ground mounted launcher, regardless of the warhead, impact patterns yielded 7 to 12 mils of dispersion. Restated, for every 1000m in range the distance between any two rockets is between 7m to 12m progressively (two rockets fired out to 3000m will be 21m to 36m apart). Army acceptance criteria for FFARs require a demonstrated consistent capability of less than 30 mils of dispersion (30m dispersion/1000m range).<sup>23</sup>

The AH64 Program Manager's office offers the following to further elucidate the nature of rocket dispersion:

The greatest error source in the [attack helicopter] rocket system is the rocket. The only guidance or aiming for the rocket is the few-hundredths of a second the rocket travels through it's launch tube after the motor is ignited. This distance is approximately four and one half feet.<sup>24</sup>

Rockets traverse the remaining 9000+ meters unguided and unpowered.

Rockets exhibit characteristics more closely related to field artillery than to guided missiles. A Directorate of Combat Developments (DCD), Fort Rucker information paper compares rocket equipped attack helicopters to field artillery thusly:

[A] destruction mission against a Soviet-styled MRR [motorized rifle regiment] . . . [required] a 24-tube battalion firing . . . 648 rounds [105 mm] . . . for destruction would need over 30 minutes to deliver the ordnance at the sustained rate of fire. The real issue here is not the amount of ordnance fired, but rather the time required to deliver it. Nine AH-1 Cobras mounted with four 19-shot rocket pods each could deliver 684 rockets to the target in under five minutes (very conservatively), with the ability to adjust fire as the MRR moved.

As stated earlier, the aerial rocket is a close cousin to the artillery round. To reiterate, it is a dispersion, area target weapon. Like any fused munition it also has potential for producing duds. In reference to figure 2, the potential for collateral damage is high.

Completing the modern attack helicopter armament is the flexible cannon. The Cobra employs a three barreled 20mm cannon capable of firing a variety of rounds at 780 rounds per minute. This cannon is effective against personnel and thin-skinned targets. Although it is employed to some accuracy by the gunner with his sighting capability, the cannon is generally an area-target engagement system.<sup>25</sup>

The M197 20mm canon fires four distinct types of rounds. They are listed and described below. High-explosive incendiary (HEI) munitions are intended for use against ground targets to include lightly armored vehicles. The round is thin-walled steel which can produce casualties to exposed personnel within a 2 meter radius, and has a fire-start capability. It has a single action point detonating fuse. This round can also be configured with a tracer element for visual observation of trajectory. Armor-piercing incendiary (API) is intended for use against lightly armored hard targets. It functions with the combined effects of incendiary and armor penetration. High-explosive

incendiary with tracer and self-destruct feature is intended for use against aerial targets. It has an HEI charge, a self-destruct relay charge, a tracer element, and a point detonating fuse. The self destruct ignites and detonates the round after 5 seconds if the round has not impacted the target.<sup>26</sup> Other than target practice rounds, all 20mm munitions are fused munitions and are therefore potential dud producers.

The Apache employs a single barreled 30mm chain gun capable of firing 650 rounds per minute. The chain gun is simple and reliable. Currently there are only two rounds in the inventory; high-explosive dual purpose (HEDP), and a target practice round. The HEDP round is an anti-materiel and anti-personnel round. The round is capable of penetrating up to 2 inches of rolled homogeneous armor at 2500 meters. Fragmentation also occurs (second purpose) which can produce antipersonnel effects within a 4 meter radius of the target.<sup>27</sup> Like the Cobra's cannon, the chain gun is an area-target weapon.<sup>28</sup>

Design specifications for the M230 30mm canon were as follows: with the AH64 hovering out of ground effect the 30mm canon would be capable of hitting a 3m x 3m target at a range of 1000m. The specification was that at least one round out of 50 would hit the target 84 percent of the time. This specification has been validated at Yuma Proving Ground in 1989 where 1 round of 50 hit a 3m x 3m target at 1000m range 86 percent of the time. Design specifications defined target effect based upon a 50m x 50m target box. Actual data show that the cannon is most effective within 1000m. At that range data show that 75 percent of all rounds fired at a 50m x 50m box impact the box. At longer ranges the percentage drops off dramatically to less than 35 percent at 2000m. At 2000m 9 rounds out of 50 will impact within the target area when fired from an Apache in an out-of-ground-effect hover.

At 3000m, 12 rounds of a 50 round burst will impact in the 50m x 50m box.<sup>29</sup> These specifications do not satisfy aircrew gunnery qualification standards as defined in TC 1-140 and have therefore been a source of great frustration to aircrews. The concerns for collateral damage are obvious. To remain below the tolerance curve crews will have to get close to the target; within 1000m.

The concerns for using 20mm or 30mm cannon in an OOTW environment stem from the nature of the weapon system as well as terminal ballistics, and unexploded ordnance production of the round it fires. By design the canon services targets that fall within a specific area. Neither the 20mm nor 30mm canon is capable of consistently impacting a point target 3m x 3m in size. They are capable of consistently destroying, neutralizing or suppressing objects which fall within a limited area; generally 50 meters square. Furthermore, dispersion of rounds is exacerbated by helicopter-induced vibration and a host of external ballistic forces. That is, forces which effect the round after it has left the barrel or launch tube and prior to its impact. Therefore, in spite of boresighting efforts which take place on the ground on a stationary aircraft, the gunner/pilot expects the need for adjustments to his aimed rounds. He adjusts his rounds through his high powered optics, or based on visual feedback from flash or burst.

As stated earlier, rocket warheads and canon munitions are susceptible to leaving unexploded ordnance (duds) within the OOTW environment. In OOTW duds present a profound problem.

Unexploded ordnance left in urban terrain or anywhere else in the OOTW environment may result in delayed collateral damage as they detonate within the hands of a curious non-combatant. This concern has generated research into a ball-type canon munition which produces a non-lethal signature upon impact. Ball-type munitions contain no

explosives. This type of round can be visually adjusted onto the target by the crew and does not create lethal residual unexploded ordnance.<sup>30</sup>

Other methods of reducing unexploded ordnance may exist. Table 6 lists certain types of 20mm rounds which possess a self-destruct capability. These rounds are designed for antiaircraft use and ground impact may defeat the self destruct mechanisms. Nonetheless, their use in OOTW is worthy of consideration.

TABLE 6  
MUNITIONS

<u>Weapon</u>	<u>Warhead</u>	<u>Range*</u>	<u>Terminal Effects</u>	<u>Accuracy</u> (Note 2)	<u>Dispersion</u>
20mm	M56 HEI	1500m	Burst, Blast, Incendiary, Fragmentation (500 frags) 2m radius, Dud Producer	80% @ 12 mils	50mx50m
	M53 API	1500m	Anti-armor, Blast, Incendiary, Dud Producer		
	M940 MPT-SD	1500m	Burst, Blast, Possible Incendiary (Tracer), Self Destruct		
	M242 HEI-T	1500m	Same as M56		
	M246 HEI-TSD	1500m	Same as HEI, Self Destruct		
30mm	M789 HEDP	1500m	Burst, Blast, Incendiary, Fragmentation 4m radius, Dud Producer (note 3)	86%	50mx50m
Rocket	M151 HE(10#)	7000m	10m Burst radius, 50m Blast radius	64%	30 mils
	M229 HE(17#)	7000m		64%	30 mils
	M261 HE-MPSM	7000m	9 ea Submunitions (SM), 195 Frags/SM @ 5000fps, 20m radius each	100%	300mx400m
	M257 Illum		Air Burst, Nonlethal, Possible Incendiary		

<u>Weapon</u>	<u>Warhead</u>	<u>Range*</u>	<u>Terminal Effects</u>	<u>Accuracy</u> (Note 2)	<u>Dispersion</u>
Rocket	M156 WP	7000m	Obscuration, Possible Incendiary		
	Flechet		2200 - 20 grain steel flechettes deployed by air burst		Excessive

Source: See notes below.

Note 1: Range data from field tests which determined most effective range. Maximum ranges for 20mm, 30mm, and rockets are 2000m, 4000m, and 10425m respectively.<sup>31</sup>

Note 2: Accuracy data from 1989 ATCOM cannon and rocket tests conducted at Yuma Proving Ground, AZ.<sup>32</sup>

Note 3: 30mm fuse armed after 100m of trajectory; reliability marginal after 1500m-1800m.<sup>33</sup>

Blast, fragmentation, burst and incendiary effects are not a recipe for success in limiting collateral damage. Notwithstanding those occasions in OOTW where force protection overrides collateral damage concern (and ROE allows) the attack helicopter's firepower can easily violate legitimacy and restraint and in effect become self defeating.

#### Non-lethal Means

The attack helicopter brings nonlethal firepower to the theater as well. This firepower is in the form of actual munitions as well as electronic intelligence (ELINT) capabilities. Attack helicopter acquisition and targeting systems designed to aid weapon system employment can be used without employing weapon systems.

The Apache is equipped with the Target Acquisition and Designation System (TADS) for 3.5 to 122 power visual, Television, Forward Looking Infrared (FLIR) acquisition, and laser rangefinding, tracking and designating. The TADS enables the gunner to acquire and

engage targets with all weapons systems in all weather conditions and regardless of ambient illumination.<sup>34</sup>

Non-lethal munitions include smoke and illumination. The commander must understand, however, that both of these munitions have the potential for inadvertent incendiary effects. During Operation RESTORE HOPE in Somalia, ground forces had a great need for illumination. "Illumination missions proved useful for both screening and city-based sweep-and-search operations."<sup>35</sup> Although mortar fires provided some of the required illumination fires, attack helicopters working jointly with ground patrols could have also provided immediate illumination without the cumbersome call for and adjustment of fires. The crew simply needs a general azimuth and fires and adjusts its own illumination based on the needs of the ground force.

During Operation JUST CAUSE Army forces also made good use of thermal imagery on the AH64 attack helicopters. "While these infrared devices are integral to the aircraft's weapons systems, they also serve well in reconnaissance."<sup>36</sup> These devices have obvious utility in OOTW in fulfilling the commander's reconnaissance and surveillance requirements.

US counterdrug operations supported by JTF BRAVO employed the AH-64 as a night-time infrared reconnaissance platform. Employing thermal imagery, the AH-64 crews easily identified alleged border violators and forwarded spot reports to the US Border Patrol.<sup>37</sup>

#### Indirect Fire Surrogate

Indirect fires are at the high ends of both the accuracy and dispersion curves; most likely well above the collateral damage tolerance level. However, the commander may require artillery ballistic effects for force protection or mission accomplishment. Attack

helicopters can provide those effects while doing so below the collateral damage tolerance level.

During Operation RESTORE HOPE/UNOSOM II in Somalia, organic mortar fires were available to ground forces. The great concern for collateral damage with indirect mortar fires severely limited their usefulness. "Extreme care must be exercised to ensure canisters do not fall in populated areas."<sup>38</sup> CPT Gus Blum, commander, B Troop, 3-17 Cavalry in Somalia during Operation UNOSOM II offered his concerns regarding employment of mortars.

While monitoring a mortar call-for-fire during a routine patrolling mission we were asked if we could spot the impact of the [high explosive mortar] rounds. Observing the entire area which included much of Mogadishu with no obstructions we could not identify round impacts. We reported "unobserved rounds."<sup>39</sup>

As demonstrated earlier, FFARs are not point-target munitions and therefore have an associated risk for causing collateral damage. However, that risk is far less than that of indirect fires from mortars and artillery. The attack helicopter brings the effects of mortar and artillery fires to the situation while using direct fire engagements which are immediately adjusted onto the target, if required, by the firing crew.

Observations made by CALL team members reference MOUT in Somalia. "Fire support is limited to direct fire systems or attack helicopters. There are many limitations to the nonprecision use of artillery. The concern for inflicting noncombatant casualties and causing unnecessary collateral damage are at the top of the list. Artillery is not precise enough for MOUT."<sup>40</sup>

During Operation JUST CAUSE, attack helicopters also gave U.S. forces highly accurate fire support. Aviators and Infantrymen alike claimed that the hellfire missile proved itself quite accurate and reasonably useful. JTF Commander LTG Carl Stiner made a special effort

to limit the use of indirect fire weapons; mortars and artillery played very little role in JUST CAUSE. This was important in controlling collateral damage which was one of the chief accomplishments of JUST CAUSE. Howitzer fire required approval from a battalion commander or above. Mostly 105mm guns were used in direct fire engagements.<sup>41</sup>

JTF BRAVO, Operation PROVIDE COMFORT supporting joint task force, employed a battalion of AH-64s from the 4th Brigade, 3d Infantry Division, with rotations from the 11th Aviation Brigade, V Corps as well. A total of 18 AH-64s were in theater at any given time.<sup>42</sup> The Task Force employed attack helicopters as an indirect fire surrogate.

AH-64 is basically a maneuver system, but in an extended TOR [theater of responsibility] with limited ARTY Support, AH-64 can become a Quick Reaction Fire Support.<sup>43</sup>

Similarly in Somalia where concerns for collateral damage were high, indirect artillery and/or mortar fires were often not an option.

The ROEs did not allow us to use any of our mortar systems during most operations, and we had no artillery in theater until after mid-October. The only fire support-element available was the attack helicopter company that was part of the quick reaction force. At times, air strikes with 20mm cannon fire and 2.75-inch rockets were brought to within 50 meters of friendly positions."<sup>44</sup>

#### Munitions Selection

A Panamanian woman and child had died on D-day in a high-rise apartment building in Colon. A Cobra helicopter gunship, hit by what was thought to be 7.62 mm sniper fire from the high-rise, fired back, blowing a large hole in the side of the building.<sup>45</sup>

Although the author of this quotation did not specify which weapon system the Cobra employed, it appears that its effects were excessive.

The commander must understand the accuracy, dispersion and terminal ballistic effects of munitions at his disposal in order to best employ them in OOTW; especially in urban terrain. In light of all the concerns of employing fire power in OOTW the commander can influence the

outcome of that employment in several ways. He can direct munitions selection, he can implement favorable methods of engagement and employment techniques, and he can capitalize on available emerging technology. The desired end-state remains to maximize target effect and minimize collateral damage.

Precision munitions such as the TOW and Hellfire are especially desired during MOUT operations. In Somalia the 10th Aviation Brigade needed all of the munitions the AH-1 brought to the theater. TOW missiles and 20mm were preferred over rockets. TOW missiles proved very effective at "building busting" as well as at destroying vehicles. Precision munitions were preferred in MOUT.<sup>46</sup> While FFARs were routinely aboard AH-1s in Somalia, their employment in MOUT was minimal.

For the Kismayo mission the weapons mix carried by the cobras included 2 TOW missiles, 2 rocket pods capable of carrying 19 rockets but they usually had few rockets (seven-shot [rocket] pods would have been better), and a full load of 20mm."<sup>47</sup>

The TOW missile demonstrated some weaknesses. When operating at night in Somalia, attack helicopter crews could not employ TOW. As configured, the deployed AH-1F aircraft were not equipped with the required night optics and TOW tracking equipment (C-NITE) necessary to launch and track a TOW during darkness. Furthermore, urban terrain posed problems. During the daylight TOW had some restrictions as well.

Because all the high tension and electrical wires were down in Mogadishu the use of the AH-1F fired TOW is a viable option. Should a fired TOW's control wires cross high tension lines damage to the missile and/or the aircraft is possible. In such situations where high tension lines are present the Hellfire missile is a better weapon choice.<sup>48</sup>

During Operation JUST CAUSE eleven Hellfire-carrying Apaches flew a total of 246 hours (138 hours at night) in 12 days delivering anti-armor, anti-aircraft, and deadly counter-sniper fires. "When the force commander could least afford collateral damage, he relied on the

near-surgical fires of the Apache."<sup>49</sup> Point-target weapons seem to be the weapon of choice when collateral damage tolerance is low.

In Somalia, 30 June 1993, six AH-1 helicopters engaged the Atto compound located within Mogadishu while firing a total of 23 TOW missiles and over 2000 rounds of 20mm into the compound. Psychological Operations (Psyops) units prefaced the engagement with written and announced warning of the impending attack. A large number of TOW missiles were used in this mission to destroy a small cluster of buildings. In spite of the high volume of TOWs employed the target was destroyed without collateral damage.<sup>50</sup>

The Italian Army deployed A-129 attack helicopters equipped only with precision munitions to Somalia in support of Operation RESTORE HOPE.

The main mission of the Mangusta is to escort transport helicopters . . . . The only weapon carried on the Mangusta in Somalia is the BGM-71C (I-TOW) missile.<sup>51</sup>

The Italian force obviously put a premium on their precision weapons in arming their attack helicopters.

The selection of area target munitions is clearly the more difficult selection. While fuse types and warheads are driven by the nature of the target and its cover and concealment, accuracy and dispersion effects are tempered by collateral damage concerns. Both considerations drive the desired terminal ballistic effects.

The missions assigned to the Diamondbacks [B Company, 2-25 ATKHB] in the MOUT required the engagement of hard targets, specifically concrete buildings . . . . In light of restrictions on shooting rockets, the ammunition available for 20mm was HEI [high explosive incendiary]. After a few engagements it became clear that API [armor piercing incendiary] would be necessary to gain a greater target effect.<sup>52</sup>

Perhaps not the munitions of choice in MOULT or in OOTW in general, area-target munitions are not discounted. Cannon munitions in particular have gotten good review.

[M]unitions, or direct fire weapons such as the . . . 20mm cannons and the AH-1F fired TOW are the types of weapons that dramatically minimize danger to friendly troops and collateral damage to civilians.<sup>53</sup>

FFARs are the furthest up the accuracy and dispersion curves and their employment is the most disconcerting. "Rockets, as an area weapon, were not employed at night due to the high risk for collateral damage and fratricide."<sup>54</sup>

In an October 1994 after action review, CALL warned of using area weapons in the collateral damage sensitive environments similar in scope to that of Somalia.

The 2.75 in rockets on the AH-1 are considered the least effective system mainly because it is an area fire weapon and the resulting accuracy is not as great as the 20mm or TOW. This can have dire collateral damage consequences in an urban terrain environment.<sup>55</sup>

Rockets, therefore, may not be the weapon of choice in MOULT or other sensitive areas.

Area target weapons were predictably outperformed by point target weapons during the raid on the Comandancia, Operation JUST CAUSE, 20 December, 1989. The plan called for two AH-64 attack helicopters to fire Hellfire missiles and 2.75 in rockets into La Comandancia. The two attack helicopters launched hellfire missiles and rockets at the building's rear. At least one hellfire scorched the second floor of the concrete building. But two 2.75 in rockets missed their targets, slamming into nearby buildings and starting fires. The effect of one stray rocket caused serious injuries to one of the soldiers of the supported 1/508th Infantry.<sup>56</sup>

Commanders may need not totally dismiss the use of rockets. The nature of rocket fires avails the crew with a variety of employment options. The effectiveness of rocket fires in terms of ballistic and collateral damage effects may be realized through the implementation of innovative and sound employment technique.

#### Methods of employment

Types of fire include running fire, diving fire, and firing from a hover. During running fire aircrews deliver ordinance while the helicopter is moving at airspeeds above 15 to 20 knots (effective translational lift, ETL). The forward airspeed of the attack helicopter adds to its stability and increases the delivery accuracy of weapon systems.<sup>57</sup> While firing from a hover the attack helicopter is stationary or slowly moving at airspeeds below ETL. Because the attack helicopter is less stable at a hover and creates severely turbulent air through which ordnance must transit, the accuracy of canon and rocket weapon systems is reduced. Missile weapons are the most effective for hover fire.

Diving fire requires the attack helicopter to fly high within the air defense weapons effective environment. However in environments such as OOTW where sophisticated air defense weapons may not be prevalent, diving fire is a viable option. It has significant advantages. In addition to all the stability advantages of running fire, diving fire advantages include: less vulnerability to small arms fire, increased weapons loads because of a decreased power requirement (hovering requires significant aircraft power), increased accuracy as main rotor downwash does not effect the flight of the round, and an increase in target acquisition and tracking capabilities compared to hover fire.<sup>58</sup> In Somalia, rockets in particular were very accurate out

to 800 meters when employed with running/diving fire at high airspeeds (120-150 knots).<sup>59</sup>

A USMC study corroborates an increase in accuracy in diving flights: "high altitude diving fire . . . improves accuracy, permits multiple runs for adjustments, permits the attack helicopters to remain above the small arms/air defense artillery range . . . ." <sup>60</sup>

Colonel Michael Dallas had great success with rocket engagements in Somali urban terrain. His attack crews employed rockets exclusively during diving fire engagements. This method minimized dispersion and vastly improved accuracy.<sup>61</sup> Attack helicopter crews can directly manipulate munition accuracy and dispersion. Aircrews use the flight profile of the aircraft to effect the round's trajectory characteristics or aerial ballistics (see glossary). The crew can manipulate the immediate aerial ballistic conditions (close to pod or gun barrel exit) encountered by the round through flight of the attack helicopter and by so doing improve accuracy and reduce dispersion. Rockets, for example, are much more accurate and have much less dispersion when employed while running or diving. Cannon accuracy may also be improved somewhat for fixed forward engagements but oblique fires during aircraft movement are less accurate.

If hover fire is the only option, attack crews can minimize collateral damage by employing rockets from a range which corresponds with greatest accuracy. Rocket engagement data show that 3000m - 4000m is the best range in terms of accuracy when firing from a hover with point-detonating fuses. Rocket training criteria in general requires 50 percent of rounds impacting a target area 300m x 400m for Apache and 300m x 500m for Cobra. Rocket data also indicate that at ranges of 3000 to 4000 meters accuracy is optimized with unitary warheads.

The attack helicopter crew selects its firing positions based on a variety of environmental and weapons capability factors. The presence of urban terrain requires consideration just as the location of a tree line or ridge line does for natural terrain influenced firing positions. The difference however is slight. While ground based "[w]eapons employment and target acquisition ranges are greatly reduced by urban features,"<sup>62</sup> attack helicopter munitions and target acquisition employment techniques require some modification resulting in no degradation of capabilities. Arguably, some techniques used in OOTW are improvements over convention.

In his unit AAR, LTC R. Lee Gore, Commander TF Raven (2-25 Attack Helicopter Battalion(+)) in Somalia, identified four primary considerations when selecting attack helicopter battle positions in a MOUT environment. These considerations were: force protection, target effect, collateral damage, and wind effects.

Force Protection considerations are for the survival of the attack helicopter and its crew. In urban terrain enemy observation and fires are an ever present threat. As such, attack helicopters should not remain in firing positions for more time than is required to acquire and engage the target. Furthermore, attack helicopters should immediately reposition to alternate firing positions upon completion of the engagement. Finally, careful intelligence should reveal which areas have the greatest potential for hostile fire and therefore should be avoided.

Target effect considerations simply consider ordnance aerial and terminal ballistics. The firing position must be located such that the ordnance can fly through its trajectory and impact on the target with the greatest effect.

Collateral damage considerations are all aimed at its reduction. Firing positions should be identified while considering 20mm ricochets, TOW missile short rounds and erratic rockets. Other possible enemy locations should be placed within these danger areas, whether in the background or surrounding ricochet areas or short of the target for rockets and missiles. Rocket firing engagements should be done with diving fire which is the most accurate technique. If so ricochet and short round effects apply in considering azimuth of engagement.

Wind effect considerations include hover fire capability (aircraft and aerial ballistics), TOW wire drift (into 20mm barrels), and target obscuration from smoke or dust (concrete dust). For hovering fire tail and cross winds are avoided. For running TOW and 20mm engagements position wind such that TOW wires are not blown into barrels. For concrete building engagements engage down wind targets first so concrete dust does not obscure subsequent targets.<sup>63</sup>

On occasion the nature of the environment renders precision munitions ineffective. A CALL team present in Somalia during Operation UNOSOM II identified such an instance.

The urban environment also creates some additional considerations for Army attack aviation. The close proximity of houses and the need to restrict collateral damage, numerous walls around the structures, and the difficulty in marking and tracking targets from stand-off distances have challenged the aircrews. The task force aviators have demonstrated that running/diving fire techniques are the best, and often the only method available for engagement.<sup>64</sup>

Area weapons employed using accuracy enhancing and dispersion reducing techniques may substitute for precision munitions whose employment is limited by terrain.

"During operations in Kismayo, the reconnaissance capability and deadly firepower of the scout-weapons team were instrumental in destroying technical vehicles and other threat equipment." Cobra crews conducted verification ranges as a result first round hits with minimum

collateral damage was achieved.<sup>65</sup> Verification ranges enable the crew to determine the accuracy of their area-target weapons in terms of pilot/gunner aiming points. The confidence developed on these ranges enabled attack crews in Somalia to destroy urban targets with area-target weapons.

### Technology

In Somalia the threat was classified as low-tech. Clan communications were often by way of beating 55 gallon drums as a means of warning. Weaponry included various small arms, RPG, 23 mm, and rocks thrown or launched from slingshots. Collateral damage concerns initially made the leadership reluctant to use AH-1Fs; press coverage of any collateral damage was extensive.<sup>66</sup>

Laser technology had perhaps the most significant impact on engaging targets quickly and with the least collateral damage. The LPL-30 (commercial hand-held laser about the size of a package of cigarettes) hand-held laser was used extensively at night by Task Force aeroscouts in Somalia to designate targets. The LPL-30 emits a thin laser beam which could range up to 4 kilometers. The impact of the beam on vehicles and other structure as well as personnel is visible only at night with night vision devices (NVD). The laser could not guide munitions but it facilitated the rapid identification of targets for the attack helicopter crews and was therefore an excellent target designator. Furthermore, the physical properties of the beam allowed for illumination of vehicle interiors as vehicle glass dispersed the laser light into the vehicle with minimal reflection. As such, would-be gunmen hiding under the cover of darkness were easily identified.<sup>67</sup>

The AIM-1 laser provided pin point accuracy for the 20mm canon.<sup>68</sup> The AIM-1 laser made 20mm fires at night extremely accurate.<sup>69</sup>

The AH-1F crew using NVDs could see the designation laser impact from the aeroscout or ground designator, superimpose the gun-mounted laser on the scout's laser impact point, then fire and adjust their rounds.<sup>70</sup>

In Somalia, to achieve efficient employment of attack helicopter munitions while minimizing collateral damage the task force employed still and motion photographic imagery. Aeroscout crews carried video camcorders on reconnaissance missions. The videos allowed the attack crews to "view" potential target areas prior to departure. The crew could war-game method of engagement and selection of munitions prior to leaving to execute the mission. Seeing the target through still and motion imagery (video tape) reduced engagement times, collateral damage and ammunition expenditure. It maximized shock effect and target destruction.<sup>71</sup> Although not deployed to Somalia, Apache attack helicopters have video capability integrated into the TADS which further facilitates video reconnaissance.

While targets were best designated at night the ability of attack helicopters to engage them was limited by the optical capabilities of the AH-1F's telescopic sighting unit (TSU). The TSU is not night capable unless fitted with the C-NITE upgrade. However, the 20mm cannon fitted with its own laser designator bore-sited to the gun, was extremely effective. As discussed earlier, the AIM-1 laser enables pin-point accuracy from an otherwise area-target weapon.<sup>72</sup>

The high powered optics inherent to the attack helicopter proved essential for operations in Somalia especially in the MOUT environment.

During MOUT operations against a militia force which tries to blend in with the civilian population, it is very difficult to distinguish combatants from noncombatants. High powered optics are used to see into confined areas, inside buildings, and into cars in an attempt to identify weapons. In order to maintain a safe distance from the potential target and the aircraft, high powered optics are needed to identify specific individuals in a crowd.<sup>73</sup>

This was the case in Panama as well.

[a]t 0100 hours 20 December, 1989 . . . AH-64s peered into the darkness--miles away from the landing zones--to see if there would be any resistance and provided withering suppressive fire when they found it.<sup>74</sup>

Sometimes the tolerance curve is very shallow and collateral damage becomes an overriding concern. During the raid into Tinajitas, Panama, Operation JUST CAUSE, preparatory fires into the landing zone were ruled out because of the populated neighborhoods surrounding Tinajitas. Normally the first stage in an air assault is the preparation of the target with fires from attack helicopters, artillery or fixed wing aircraft to suppress enemy defenses. "We put our soldiers at risk in order to minimize casualties and damage to the Panamanian people and their country."<sup>75</sup>

Emerging technology has great promise for use in the OOTW environment. The concerns for extremely perishable intelligence may be partly alleviated through the use of real-time intelligence and reporting provided by the improved data modem (IDM) system, and real-time imagery provided by the video downlink charged coupled device (CCD) camera. The IDM will be integral to the AH64D Longbow allowing the crew to gather and distribute information to other crews and the chain of command simultaneously. The CCD video downlink enables the crew to provide real time video imagery to ground operations centers through secure radio frequencies. CCD is currently employed on the OH-58D Kiowa Warrior helicopter.<sup>76</sup>

#### Summary

The firepower of the attack helicopter is significant. Perhaps the greatest strength, however, in employing attack helicopter munitions resides in its point-target weapons. Laser and wire-guided missiles minimize collateral damage and are employable in most types of terrain

to include urban terrain. If the commander decides to employ any attack helicopter munitions in OOTW, especially in urban terrain, he must carefully consider the firepower curve and assess the environment's tolerance level for collateral damage. The METT-T-P analysis' findings may indicate that the environment is not suitable for any heliborne munitions regardless of accuracy and/or dispersion.

### Psychological

Attack helicopters exist for one purpose - to kill things - no other. Their value in OOTW is that they deter aggression. If deterrence fails, they restore the peace.<sup>77</sup>

To deter a rational or irrational threat quite often is to intimidate that threat.

Looks are everything. Whether it is the AH64 Apache or the A-129 Mangusta, the attack helicopter is an intimidating sight. Noise and appearance combined may achieve the requisite amount of intimidation to defuse a riotous situation.

PROVIDE COMFORT psychological operation themes included several messages to Iraqi forces stating allied resolve to protect humanitarian operations. General Shalikashvilli directed the distribution of leaflets which included his signature to Iraqi forces stating, "Our soldiers will not harm you unless you attack them, or the people they are protecting. Do not try to stop the humanitarian actions of the world!"<sup>78</sup> These words needed some strong backing.

At the tactical level General Shalikashvilli's warnings were given credence. A Group Scales Papers report on Operation PROVIDE COMFORT bears testimony to US resolve.

American attack aircraft assisted by making threatening passes overhead as these discussions [between US and Iraqi force leaders] took place. Lieutenant Colonel John Abazaid, an Arabic linguist and commander of 3-325 [Infantry Battalion], went forward on at least one occasion and told the Iraqis face to face that if they did not withdraw he would have to kill them.<sup>79</sup>

Among the attack aircraft conducting threatening passes were AH-64 helicopters.

Attack helicopter psychological effect extends beyond potential combatants. The presence of an attack helicopter immediately begs the questions of restraint and legitimacy; our OOTW principles. National and world support for our efforts in an OOTW problem may be won or lost based upon perceptions of our adherence to these principles. The perception of the use of unnecessary overwhelming force as provided by the attack helicopter may be enough to lose the support of favorable opinion and the support of the host nation as well.

This section will address the psychological effects of employing attack helicopters in OOTW at tactical as well as strategic levels.

#### Tactical

The psychological effect of the attack helicopter is manifest in two basic functions to achieve deterrent ends. They are "show of force" and "force protection." Throughout recent attack helicopter employments these two functions were prevalent and often assigned as missions with the intent to deter aggression.

#### Show of Force

In addition to other joint air assets the attack helicopter is instrumental in showing initial resolve. Lieutenant Colonel (Retired) Hunt advocates this early aircraft presence.

Low level fly overs by high performance aircraft and armed helicopters add to the psychological effect. The belligerents must understand that they face a formidable military potential whose determination they must take seriously.<sup>80</sup>

The psychological impact of the AH-1 was evident in Somalia during Operation RESTORE HOPE as well. The 10th Mountain Division

Executive Summary of operations in Somalia highlighted attack helicopter effects. "The attack aviation provided the mobile, discriminatory firepower required for this environment. Their presence also provided a psychological effect that helped to intimidate potential threats."<sup>81</sup>

Humanitarian Relief missions should not require operational level demonstrations of force. However at the tactical level, show of force may be essential to continuing the higher overall relief mission. Such was the situation in Somalia.

The "eyes over Mogadishu" mission was a make noise, show of force mission. Cobras were loaded with rockets and 20mm but their primary mission was a demonstration of presence and resolve.<sup>82</sup>

Operation UPHOLD DEMOCRACY rapidly changed from a forced entry mission to a cooperative Nation Assistance operation. Some residual resistance to the return of the Aristide administration, however, remained. Cobra helicopters from the 10th Mountain Division provided a worthy deterrence against these would-be hostiles.

Just a block from the airport where U.S. troops landed, a pick-up truck full of Haitian paramilitaries in civilian clothes watched warily, their submachine guns hoisted in the air. As the first wave of Cobra attack gunships appeared overhead, they sped away.<sup>83</sup>

On 22 September the threat of an imminent attack on US forces in Haiti was broadcast over one of the Infantry Battalion radio nets. Attack helicopters were involved in the response. "Soon a Cobra attack helicopter and a Kiowa scout helicopter appeared over the port, circling . . . the apparent threat diminished."<sup>84</sup>

The Army CALL summarized the Task Force response in dealing with the threat from disaffected elements of Haitian society. Fourteen Attack helicopters were in country. "The presence of highly disciplined troops supported by . . . attack helicopters . . . was enough to dissuade anti-American elements from confrontation."<sup>85</sup>

The PROVIDE COMFORT humanitarian assistance operation conducted in Northern Iraq saw a great need for both show-of-force and force protection. Attack helicopters played an important role in performing both of these missions. CALL reported, "[d]uring Operation PROVIDE COMFORT (humanitarian assistance in Northern Iraq), the Joint Task Force (JTF) used aviation assets in a show of force role."<sup>86</sup> Attack helicopters supported ground patrols throughout the AO. Ground patrols employed the "flying checkpoint" technique. Flying checkpoints were, in effect, random patrols that would establish themselves as a show-of-force to protect aid operations. Attack helicopters overwatched these checkpoints adding to the show of force and capitalizing on the psychological effect of the attack helicopter.<sup>87</sup>

#### Force Protection

Forces require protection as the threat of open aggression against OOTW operations increases. The simple presence of an attack helicopter is documented as to being enough to provide protection to ground forces. In Panama, during Operation Nimrod Dancer, the prelude operation to Operation JUST CAUSE, ground patrols frequently encountered threatening resistance. When a patrol encountered such resistance, senior level leadership approved air demonstrations. As a result " . . . armed helicopters were brought to hover at the scene."<sup>88</sup> No rounds were exchanged and the demonstrations diffused threatening situations and protected patrols.

In Somalia, scout and attack helicopter urban terrain flights dubbed "Eyes over Mogadishu" as well as other aerial patrolling had significant psychological effect. Scout-Weapons Team (SWT) leader, CW2 Jeff Fraher offers first-hand observation of his SWT's impact on the threat's psyche.

Quite simply the presence of the cobra was clearly intimidating to the Somalis. Scout helicopters during patrolling would routinely be peppered with stones and other debris thrown by Somalis from the ground. As we conducted our patrols with at least a scout and gun together the cobra was not far from the scout. Rocks were not thrown at the cobra. The Somalis would run when the cobra was brought in low and close to a gathering on the ground. The Somalis referred to the cobra as the "bird that flies all night and spits rocks [translation]." <sup>89</sup>

Operations during UNOSOM II continued to see the psychological impact of the attack helicopter. As CALL reported, "[w]ithout the deterrent presence of the aviation forces over Mogadishu it would have been extremely risky for coalition forces to conduct operations in the city." <sup>90</sup>

During Operation PROVIDE COMFORT operations conducted from mid-April to July of 1991 by the 325th Airborne Battalion from Vicenza, Italy witnessed the psychological impact of the AH-64 as it protected the force. The battalion commander relied upon the presence of the AH-64 to diffuse dangerous situations.

During particularly dangerous night situations, we called for Apache support and found that the end of the crisis often coincided with the arrival of the attack helicopters. There was no doubt that aircraft circling in the vicinity of our positions during tense moments had a sobering effect on potential adversaries. <sup>91</sup>

In Somalia during Operation RESTORE HOPE, overall weapons use by US forces was infrequent as compared to UNOSOM II which followed. Tenth Mountain Division AH-1s flew many missions as part of the operation's security force. CALL attributes attack helicopter psychological effect to initial success in its security and reconnaissance role.

[T]he division's cavalry squadron provided armed reconnaissance and security for the force. The impact of the AH-1 (Cobra) attack helicopter cannot be understated. The psychological effect of attack helicopters established the aircraft's value--even without firing a shot. <sup>92</sup>

During the raid on Panama Viejo during Operation JUST CAUSE, 20 December 1989, a ZPU-4 four barreled anti-aircraft gun was positioned

near the shoreline to fire out over the water and into the flight path of most of the air lift. Loaded with ammunition, the gun was in good position to engage and destroy assault helicopters carrying infantry forces to the objective. The ZPU-4 gunner never fired a shot. He fled as one of the Cobra attack helicopters swooped down towards him.<sup>93</sup> Without firing a shot, the swooping Cobra elicited an immediate cognitive response from the gunner making flight his obvious choice of action.

### Strategic

Psychological effect at the strategic level addresses National and World opinion/support of US military involvement in OOTW. It addresses the operation's compliance with OOTW principles in terms of overall mission and desired end-state. It is at the heart of the suitability test. Often the mission-type label given to an operation has profound impact on the type of equipment employed to support that operation regardless of military needs as illustrated below.

In general, outside of war or off the parade field, the appearance of military weaponry does not sit well with the US public. In a Center for Army Lessons Learned document which reviews military operations in civil disturbance, the center advocates careful consideration when contemplating a military response.

Be sensitive to the traditional American disquiet of standing armies and martial law. Leave behind weapons and equipment unsuited to the task of restoring calm to a US city and use personnel associated with those weapons and equipment in a liaison role.<sup>94</sup>

Public feelings of disquietude toward the domestic use of the military are intangible but nonetheless real, pervasive and powerful. Most nations in varying degrees share a certain degree of apprehension toward military action. Taking into account the origins of those nations at

greatest risk for civil disturbance as sited in chapter one, one can expect considerable public apprehension towards military action; especially from foreign militaries. Weapons unsuited to restore calm in US cities may likewise be deemed unsuitable for use in foreign cities. In OOTW, intimidation of non-combatants is of utmost concern and should its avoidance should be considered during METT-T-P analysis.

British analysis of their role in PROVIDE COMFORT illustrates the level of care which may be required when considering employing one's weapons against the backdrop of political/national sensitivity. The British government was concerned about perceptions of over-aggressiveness as it contemplated its PROVIDE COMFORT supporting force package. "[T]he British were not allowed to bring their artillery into Iraq until mid-May due to the perception by British officials that an artillery unit was inappropriate for a humanitarian mission."<sup>95</sup> Ultimately, the British government's concerns of perception kept an asset from the theater. For this mission, dubbed "humanitarian," artillery assets carried the stigma of excessive force. Not wishing to threaten legitimacy with a perceived violation of restraint, the British government acted prudently.

The strategic psychological impact of the attack helicopter may be less averse than equipment with similar firepower capabilities. Where the field artillery canon has but one function, the multi-role capability of the attack helicopter (reconnaissance, security, attack) may temper opinion in its favor in spite of its aggressive sounding name. Supporting nations may justify attack helicopter presence by citing security or armed-reconnaissance needs.

Some OOTW operations, due to regional location, are sensitive to attack helicopter employment as well. During JTF BRAVO, counterdrug operations, there was much concern for the psychological impact and

possible public consternation for the use of attack helicopters. Furthermore, Mexican sovereignty and relations dictated limitations of daylight AH-64 border flights and made accidental overflight of the border absolutely intolerable. As such, attack helicopter operations were restricted to night-only operations.<sup>96</sup>

While developing the force structure with which to deploy to Somalia in support of Operation RESTORE HOPE, the 10th Mountain Division was hesitant to include attack helicopters. The mission was humanitarian assistance, and the Marine Corps had attack helicopters in theater. The 10th Mountain leadership felt that the USMC could cover the theater's attack helicopter's needs. METT-T-P analysis seemed to indicate that the threat did not warrant additional attack helicopters in the theater. Colonel Dallas, 10th Aviation Brigade Commander, argued for taking his cobras. He saw an uncertain threat in a large area of operations. He wanted as a minimum the psychological impact and intimidation factor of his attack helicopters.<sup>97</sup> Strategic psychological impact blocked the means of achieving tactical psychological effect. Persistence paid off and Colonel Dallas was successful in deploying the attack helicopters with the Division Reconnaissance Squadron. Eventually as clan aggression increased the strategic psyche became more tolerant of increases in firepower and the Division Attack Helicopter Battalion assumed command and control over army attack helicopter operations.

The strategic psychological effect of deploying attack helicopters as well as other combat systems is sometimes a function of the success of previous OOTW operations. On the heels of UNOSOM II was Operation UPHOLD DEMOCRACY. The shocking UN and US losses in Somalia tempered US criticism of deploying to Haiti with a bigger combat package. As reported in Newsweek, 19 September, 1994,

the pentagon has gone to extraordinary lengths to hold down the cost in American blood . . . the assault now involves some of the mightiest combat systems in the arsenal.<sup>98</sup>

#### Summary

There is a distinct and unique psychological effect provided by military aircraft. Attack helicopters in particular seem to intimidate and cause restraint or caution in the actions of OOTW threats. Whether the effect at the tactical level is productive or a detraction from mission accomplishment is usually measurable and apparent. The end state is simply protection of friendly forces while avoiding casualties on either side.

In OOTW, however, the employment of a tactical system like the attack helicopter has immediate Strategic impact in terms of psychological effect. There are certainly several OOTW operations which should have no requirement for attack helicopters. The presence of an attack helicopter in disaster relief or humanitarian assistance for example goes beyond restraint and common sense. Indeed such employment begs restraint and raises suspicion in the world community. Yet attack helicopters were deployed to assist in Humanitarian efforts in Somalia, albeit after some debate. Fortunately the 10th Mountain Division in its study of its mission determined the need for its attack helicopters in spite of the name of the overall mission.

Decision makers must weigh the ramifications of deploying with or without attack helicopters. While they make good sense when force protection and show of force are essential tasks, attack helicopters directly effect national and world opinion of legitimacy and restraint.

### Endnotes

<sup>1</sup> Michael Gawkins, Lessons Learned From Somalia, C/2-25 ATKHB, 22 April 1993 - 30 August 1993, Ft. Drum, New York: 10th Mountain Division, 1993.

<sup>2</sup> Dennis Steele, "The U.S. Army in Haiti," Army (November 1994): 18.

<sup>3</sup> "Somalia: Manhunt," Economist, 328 (September 18, 1993): 46.

<sup>4</sup> U.S. Army, Field Manual 90-10, Military Operations on Urban Terrain, (Washington, D.C.: Headquarters, Department of the Army, 15 August 1979), 1-10.

<sup>5</sup> Thomas Donnelly, Margaret Roth, and Caleb Baker, Operation JUST CAUSE, The Storming of Panama, (New York: Lexington 1991), 224.

<sup>6</sup> Jeffrey M. Lenorovitz, "Rooivalk Tailored For Low-Level Combat," Aviation Week & Space Technology (13 December 1993): 50-51.

<sup>7</sup> E.H. Grayson Jr., "Army Aviation 1984 to 2015," U.S. Aviation Digest (November 1984): 3.

<sup>8</sup> U.S. Army, Training Circular 1-140, Helicopter Gunnery, (Washington, D.C.: Headquarters, Department of the Army, 30 September 1991), 4-10. Hereafter referred to as "TC 1-140."

<sup>9</sup> Ibid. 4-7.

<sup>10</sup> Wayne A. Downing, "Army Aviation and the Changing Threat" Army Aviation (31 July 1994): 10.

<sup>11</sup> John B. Hunt, "Thoughts on Peace Support Operations," Military Review, 10 (October 1994): 83.

<sup>12</sup> The TOW is a heavy antitank/assault weapon. TOW uses optical and infrared means to track a target and guide the missile. TOW is effective during day and at night if the attack helicopter is equipped with thermal sites. TC 1-140, 6-2.

<sup>13</sup> Apache can fire its missiles from cover, without exposing itself to enemy view. Only the target designator team needs to keep the target in view to guide the missile to its destination. W.D. McGlasson (ret.), "AH-64 The Attack Helicopter of the Future," National Guard (October 1983): 23.

<sup>14</sup> Harold K. Neilsen, "Longbow Apache: The Year of Test," Army Aviation, (31 May 1994): 21.

<sup>15</sup> John D. Williams, "Information Paper, Live Fire Data", Helicopter Gunnery Department, USAAVNC, 10 January 1994. Data collected by 7th ATC, Grafenwoehr Training Area. Data from 1st AD, 3d ID, and 11th BDE AH64 gunneries, CY 93. Hereafter referred to as "Live Fire Data."

<sup>16</sup> The Hellfire missile is also called the *point fire weapon* system. It is the primary armament of the AH64 and is also employed from the AH-1W. It is designed to neutralize tanks and other hard point targets. This system employs the Hellfire missile in a variety of conditioned. These include day and night, single or multiple launch sequences, line of sight and masked launches, with autonomous and remote designators. TC 1-140, 6-2.

<sup>17</sup> TC 1-140, 6-1.

<sup>18</sup> Ibid. 4-7.

<sup>19</sup> Ibid. 4-7.

<sup>20</sup> Ibid. 6-25 to 6-26.

<sup>21</sup> E.J. Everett-Heath, "The Development of Helicopter Air-to-Ground Weapons," International Defense Review (March 1983): 327.

<sup>22</sup> High-explosive multipurpose submunition (MPSM HE) provides improved lethal effects against area targets such as light armor, wheeled vehicles, materiel, and personnel. The SM has a shaped charge for armor penetration and is internally scored to optimize fragmentation against personnel and materiel. TC 1-140, 6-20 to 6-23.

<sup>23</sup> Williams, "Live Fire Data."

<sup>24</sup> Ibid.

<sup>25</sup> Everett-Heath, 327.

<sup>26</sup> TC 1-140, 6-12.

<sup>27</sup> Ibid. 6-15.

<sup>28</sup> Everett-Heath, 327.

<sup>29</sup> John D. Williams, "Information Paper, 30mm Cannon Accuracy," Helicopter Gunnery Department, USAAVNC, 3 March 1994. Hereafter referred to as "30mm Cannon Accuracy."

<sup>30</sup> This discussion of an OOTW friendly 20/30mm round is from a phone conversation with CPT(P) John D. Williams, Gunnery Branch, Directorate of Combat Developments, Fort Rucker, Alabama.

<sup>31</sup> Maximum ranges and blast data for rockets are from TC 1-140, 6-19 to 6-25.

<sup>32</sup> John D. Williams, "Information Paper, AH-64 Rocket System Accuracy," Helicopter Gunnery Department, USAAVNC, 3 March, 1993. Hereafter referred to as "Rocket System Accuracy." Information also from Williams, "30mm Cannon Accuracy,".

<sup>33</sup> Data show that the maximum effective range of 30mm munitions is not 3000m; 1989 McDonnell-Douglas 30mm cannon test revealed no targets hits at 2000m and 50 percent hit probability between 1000m and 2000m; 1991 ARI test conducted at Fort Hood, Texas determined 30mm cannon effectiveness drops dramatically at 1700m; 1993 test at Grafenwoehr, Germany shows consistent target hits at 1500m. Data compiled in Williams, "Rocket System Accuracy," and "30mm Cannon Accuracy."

<sup>34</sup> Improvements in the Hellfire system currently underway include a fire-and-forget seeker launched from the AH64 D Longbow Apache. The Longbow will be capable of multiple, simultaneous fire-and-forget Hellfire engagements. Fully developed, the AH-64D's mission will be to employ - massed, overwhelming destructive firepower capable of defeating heavy armor with a highly accurate long range point target munitions. Everett-Heath, 326.

<sup>35</sup> Martin N. Stanton, "Task Force 2-87, Lessons from RESTORE HOPE," Military Review (September 1994): 39.

<sup>36</sup> Donnelly, Roth, and Baker, 157.

<sup>37</sup> Stevens interview.

<sup>38</sup> Stanton, 40.

<sup>39</sup> Interview with Gus Blum, Commander, B Troop, 3-17 Cavalry, 10th Mountain Division, 5 August 1994.

<sup>40</sup> U.S. Army Operations in Support of UNOSOM II (final draft), Center for Army Lessons Learned (CALL), US Army Combined Arms Command, Ft. Leavenworth, KS, October 1994, 4. Hereafter referred to as "CALL, UNOSOM II."

<sup>41</sup> Donnelly, Roth, and Baker, 406.

<sup>42</sup> Group Scales Papers, "Report, JTF BRAVO, AAR, PROVIDE COMFORT." Gulf War Collection, US Army Combined Arms Command, Ft. Leavenworth, KS, 1991, 21.

<sup>43</sup> Ibid. 9.

<sup>44</sup> Charles P. Ferry, "Mogadishu, October 1993: A Company XO's Notes on Lessons Learned," Infantry (November-December 1994): p. 37.

<sup>45</sup> Donnelly, Roth, and Baker, 292.

<sup>46</sup> From phonecon interview with COL Michael Dallas, Assistant Division Commander - Support, 10th Mountain Division (LI), Fort Drum, New York, 22 February, 1995. COL Dallas was the 10th Aviation Brigade Commander when elements of the brigade deployed to Somalia. He deployed as well.

<sup>47</sup> Jeffrey Fraher, Phonecon interview with CW2 Fraher while he was at Fort Rucker after returning from Somalia with the 10th Mountain Division. CW2 Fraher was a scout pilot for Task Force Raven as part of the 10th Mountain Quick Reaction Force (QRF). He served two tours in Somalia for 3 then 5 months. He was an Air Mission Commander for Night Vision Goggle (NVG) flights in Somalia. His team was normally one scout and one cobra helicopter.

<sup>48</sup> CALL, UNOSOM II, I-6-2.

<sup>49</sup> Rudolph Ostovich III, "Army Aviation: Lethal, Versatile, Deployable," Army (August 1990): 24.

<sup>50</sup> Brett Johnson, After Action Review, TF Mountain Warrior, 30 Sep, 1993.

<sup>51</sup> Paolo Valpolini, "Somali baptism for latest Italian army hardware," International Defense Review (September 1993): 734.

<sup>52</sup> Gawkins.

<sup>53</sup> CALL, UNOSOM II, I-6-2.

<sup>54</sup> Johnson.

<sup>55</sup> CALL, UNOSOM II, I-5-23.

<sup>56</sup> Donnelly, Roth, and Baker, 157.

<sup>57</sup> TC 1-140, 5-3.

<sup>58</sup> Ibid. 5-4.

<sup>59</sup> Fraher interview.

<sup>60</sup> Commanding General, USMC Air Ground Combat Center, "Combined Arms Exercises; An Overview, US Army Combined Arms Command, Ft. Leavenworth, KS, 1991, 25.

<sup>61</sup> Dallas interview.

<sup>62</sup> FM 5-101, Mobility, 23 January 1985, p 1-11.

<sup>63</sup> Four considerations for attack helicopter battle position selection is summarized from Johnson.

<sup>64</sup> CALL, UNOSOM II, I-5-23.

<sup>65</sup> Operation RESTORE HOPE Lessons Learned Report, Operations Other Than War. Ft. Leavenworth, Kansas: Center for Army Lessons Learned (CALL), 15 November 1993, XIV-20. Hereafter referred to as "CALL, RESTORE HOPE."

<sup>66</sup> Fraher interview.

<sup>67</sup> Johnson.

<sup>68</sup> CALL, RESTORE HOPE, XIV-21.

<sup>69</sup> Dallas interview.

<sup>70</sup> Fraher interview.

<sup>71</sup> Johnson.

<sup>72</sup> Ibid.

<sup>73</sup> Ibid.

<sup>74</sup> Ostovich, 21.

<sup>75</sup> Donnelly, Roth, Baker, 222.

<sup>76</sup> Dewitt T. Irby, Jr., "Army Aviation Modernization," Army Aviation, (March-April 1994): 24.

<sup>77</sup> William H. Bryan, Director, Department of Evaluation and Standards, Fort Rucker, Alabama. E-mail response to the author's solicitation for COL Bryan's personal thoughts on the subject as well as any initiatives his department was undertaking reference helicopter operations in OOTW.

<sup>78</sup> Pollard, James E. Operations Other Than War Volume I, Humanitarian Assistance, Newsletter No. 92-6. Ft. Leavenworth, Kansas: Center for Army Lessons Learned (CALL), December 1992, 16. Hereafter referred to as "CALL, Humanitarian Assistance."

<sup>79</sup> Group Scales Papers, 21.

<sup>80</sup> John B. Hunt, "Thoughts on Peace Support Operations," Military Review, 10 (October 1994): 80.

<sup>81</sup> Arnold, S.L., "An Operation Other Than War," Military Review, 12, December 1993, 26-35, reprinted in C520, Operations Other Than War (OOTW), US Army Command and General Staff College, 2 January 1995.

<sup>82</sup> Fraher interview.

<sup>83</sup> "Cheering crowds welcome U.S. troops in Haiti," The Kansas City Star, 20 September, 1994, A-8.

<sup>84</sup> Sean D. Naylor, "Rules change gives morale shot in arm," Army Times, 3 October 1994, 20.

<sup>85</sup> CALL, UPHOLD DEMOCRACY, iv.

<sup>86</sup> Somalia, Newsletter No. 90-3, Ft. Leavenworth, Kansas: Center for Army Lessons Learned (CALL), January 1993, 14. Hereafter referred to as "CALL, Somalia."

<sup>87</sup> Walley, James R. Sr., Haiti, CALL Newsletter No 94-3. Ft. Leavenworth, Kansas: Center for Army Lessons Learned (CALL), July 1994, III-2. Hereafter referred to as "CALL, Haiti."

<sup>88</sup> Hunt, 82.

<sup>89</sup> Fraher interview.

<sup>90</sup> CALL, UNOSOM II, I-5-2.

<sup>91</sup> John Abizaid, "Lessons for Peacekeepers," Military Review, (March 1993): 80. Reprinted in C520, Operations Other Than War (OOTW), (US Army Command and General Staff College, n.p.: 2 January 1995).

<sup>92</sup> CALL, RESTORE HOPE, XIV-20.

<sup>93</sup> Donnelly, Roth, and Baker, 220.

<sup>94</sup> Operations Other Than War Volume III, Civil Disturbance, Ft. Leavenworth, Kansas: Center for Army Lessons Learned (CALL), November 1993, 3. Hereafter referred to as "CALL, Civil Disturbance."

<sup>95</sup> Group Scales Papers, 21.

<sup>96</sup> Interview with MAJ Steve Stephens, Operations Officer, 1-1 Attack Helicopter Battalion, 1st Infantry Division (Mech), JTF BRAVO.

<sup>97</sup> Dallas interview.

<sup>98</sup> John Barry and Douglas Waller, "How U.S. Troops Would Go In," Newsweek (19 September 1994): 41.

## CHAPTER 5

### CONCLUSIONS AND RECOMMENDATIONS

#### Conclusions

Based upon the analysis conducted in this thesis, the attack helicopter has a unique role in operations other than war.

The four capabilities analyzed in this thesis do not encompass all attack helicopter capabilities; others include shock effect, massing of fires and range. The four capabilities, however, are those which seem to have the most significance in OOTW and are indeed highlighted by such operations.

#### Substitute Systems

The singularly unique capability brought to the OOTW environment by the attack helicopter is mobility. Mobility separates the attack helicopter from any other combat system in performance during operations in the OOTW environment. A multitude of other ground combat systems possess capabilities of firepower, agility and psychological effect in varying degrees; some exceed the effect of the attack helicopter's corresponding capability. None, however, provides the combined capability effects centered upon mobility as attack helicopter.

In terms of force protection and show of force requirements, fixed-wing platforms such as AC130, and a myriad of fighter and reconnaissance aircraft possess great firepower, psychological effect and mobility but lack the loitering capability essential to agility. In terms of legitimacy and restraint the firepower of these fixed-wing

assets (particularly AC130) may be self-defeating.

Comparable ground combat systems such as the M24 Sheridan light tank, USMC LAV, and TOW-HMMWV also possess impressive firepower and psychological effect but lack the agility and mobility of the attack helicopter.

Infrared optics systems found aboard attack helicopters make them invaluable in the OOTW environment. These systems provide night reconnaissance at a level of detail which no other ground or fixed-wing system can provide.

There is no consistent solution for determining which combat systems deploy and which remain from the OOTW operation. The commander's METT-T-P analysis will determine his requirements for mobility, agility, firepower, and psychological effect. There will be operations that may not require the capabilities of attack helicopters. However the synergistic effects of the attack helicopter's capabilities make leaving it home an unlikely choice. The number of operations not warranting the capabilities of the attack helicopter will be few.

#### Mobility

The attack helicopter possesses tactical and strategic (AH64) mobility for the commander. Tactical mobility satisfies the generally restrictive terrain of the OOTW environment. Strategic mobility facilitates and simplifies deployment. Attack helicopters avoid creating collateral damage to roads, fields, and other impact sensitive surface conditions.

#### Agility

OOTW threat response dictates the need for agility. Attack helicopters can receive a change in mission and, principally due to

their mobility, rapidly respond. The duration of intelligence in the OOTW environment is short and its accuracy is highly perishable. Attack helicopter mobility enables the exploitation of intelligence while it is still fresh. Furthermore, emerging technologies will enable attack helicopters to confirm intelligence through near-real-time downlinked imagery.

### Firepower

Today's attack helicopters were designed for a high intensity antitank role. As such, the firepower capabilities of the attack helicopter are significant. METT-T-P analysis should yield caution in deployment and subsequent employment of attack helicopters. Each attack helicopter weapons system varies in suitability for application in the OOTW environment. Commanders must identify the environment's damage tolerance levels and choose a suitable accuracy, dispersion, and ballistic effects.

Weapons capabilities alone do not entirely dictate munitions effects. Methods of engagement also directly influence accuracy and dispersion of munitions and can minimize collateral damage. Commanders must be aware of the terminal ballistic effects achieved by methods of engagement and consider employment in the context of the OOTW environment. Furthermore, aircrews must be proficient in these techniques as well as munitions selection to carry out the commander's intent successfully and within the guidelines of ROE.

Technology is available to further facilitate accuracy and dispersion of area target weapons. Aircraft systems and off-the-shelf systems aid aircrews in target identification and designation. Technology also facilitates the commander's reconnaissance efforts.

The employment of precision munitions greatly simplifies collateral damage concerns notwithstanding the risk of collateral damage from the occasional erratic missile. However, the commander can not service every OOTW target with guided missiles. Not only is cost prohibitive, but the terminal ballistic effects of the missile may far exceed the requirement. Attack helicopter area target weapons can provide the effects desired.

Cannon and FFAR employment come with significant risk in incurring collateral damage. By design and by nature these munitions exhibit considerable dispersion and limited accuracy. By employing certain methods of engagement and emerging technology the accuracy and dispersion of these munitions are brought within the collateral damage tolerance level.

#### Psychological Effect

Attack helicopters greatly help to deter aggression in the OOTW environment. Their presence has been enough to disperse aggressive crowds and diffuse tense situations. The psychological effect of the attack helicopter translates directly to showing force and demonstrating resolve.

The commander's METT-T-P analysis will yield a concern for the presence of attack helicopters in an OOTW environment in terms of a negative psychological effect upon the world community. In particular "legitimacy" and "restraint" move to the forefront of the debate over whether or not to deploy attack helicopters as part of the solution to the OOTW problem. The perceptions generated by attack helicopters must weigh on the deployment decision.

### Attack Helicopter Effectiveness

The effectiveness of the attack helicopter in OOTW varies from operation to operation. The measure of effectiveness must be gauged by the success of the overall operation and accomplishment of the strategic OOTW objective. Analysis easily falls into the "tactical" trap which assesses combat systems on their impact at that level. OOTW tactical actions may have direct Strategic impact. A tactical victory through overwhelming firepower may lead directly to alienation and overall failure as was the case in Soviet occupied Afghanistan, Vietnam, and in Somalia.

Post-Operation UNOSOM II reports further demonstrate this point. Somalia became a veritable test-bed for attack helicopters in OOTW. In terms of force protection it is fortunate that they were present. In terms of legitimacy and restraint a different conclusion may be drawn. During a recent television news magazine report on the outcome of the Somali mission the following perceptions were made by Somalis present during the operation and interviewed by reporter Ted Koppel.

The Abdi house raid [which included several attack helicopters] was an effort to kill, not to abduct. They killed woman, children, religious leaders. After this we did not trust the Americans. They fired 20mm, 40mm. I think they even fired TOW missiles.<sup>1</sup>

Certainly in the eyes of this Somali the US mission violated restraint, and ultimately legitimacy.

During the same news program the raid on the Aideed compound was discussed. "An amazing thing happened. Somalis came to arms without any orders. It was a Somali thing."<sup>2</sup> By this time in the operation US and UN efforts became anti-Somali in the eyes of many Somalis. We (the UN forces) became the enemy. Legitimacy waned and Somali aggression intensified which, in turn, required an increasing need to violate restraint. As this cycle continued all hope for nation building and

peaceful operations in the country slipped away.

Mr Koppel's report included the frustration and dismay that ultimately lead to the US and UN withdrawal.

The American people could not understand. We went over to help these people. There was not a good answer for such action [dragging dead US soldier through the streets of Mogadishu]. Failure was a Somali failure. They did little to help themselves.<sup>3</sup>

There is another analysis trap. If the use of combat power violates restraint and legitimacy, casualties which result from constrained firepower may violate perseverance. One can only speculate as to Soviet success in Afghanistan if Soviet forces decided to trade their soldiers for the hearts and minds of the Afghan people. The hearts and minds and support of the Soviet people arguably would be jeopardized, thus weakening perseverance.

The effectiveness of the attack helicopter is subject to the decisions of the command. The decisions of the attack helicopter crew impact on its effectiveness as well. One may draw various conclusions on effectiveness during the operation. Ultimately, the effectiveness of the attack helicopter depends on the command established rules of employment/engagement and the proficiency/professionalism of the crew.

Rules of engagement and standard fire control measures were the principle constraints placed on attack helicopters. These constraints impact, in effect, on but one of the four capabilities - firepower. As such, the attack helicopter's other capabilities continued to support the commander's overall mission unrestrained.

#### Recommendations

Munitions which produce desired terminal ballistic effects while minimizing collateral damage appear to be undergoing developmental consideration. Recommend continuation of such munitions development.

The Aviation Proponent at Fort Rucker is studying applicable tactics, techniques, and procedures for helicopter employment in OOTW. The Directorate of Combat Developments at Fort Rucker is also exploring revisions to TC 1-140 (Aerial Gunnery) to train rocket employment and adjustment techniques. Recommend continuation of these efforts.

#### Further Study

Attack helicopter firepower in OOTW is worthy of continued further study. Robert H. Scales dedicated 340 pages to this subject in general terms in his recently published Firepower in Limited War, (Presidio Press).

Recommend further study on CSS/Logistical support for deployed attack helicopters. Further study should explore the deployment, distribution and sustainment of supply classes III and V.

Recommend further study on combat crew training and collective training gunnery skills and non lethal techniques.

Endnotes

<sup>1</sup> Ted Koppel, "Nightline," National Broadcasting Company (NBC), 1 March 1995.

<sup>2</sup> Koppel.

<sup>3</sup> Koppel.

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